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Bibliography on Storm Surges, p. 370

. 6 March 1955 No. 3

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 6 MARCH, 1955 No. 3

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on Storm Surges

by
Mollie P. Kramer

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Bibliographies published this year are:

1. **Bibliography of Bibliographies on Meteorology,** Vol. 6, No. 1, Jan. 1955
2. **Textbooks and Monographs Containing Subject Bibliographies,** Vol. 6, No. 2, Feb. 1955
3. **Storm Surges,** Vol. 6, No. 3, March 1955

Forthcoming bibliographies will be:

4. **Ionospheric Propagation,** Vol. 6, No. 4, April 1955
5. **Photochemistry of Upper Atmosphere,** Vol 6, No. 5, 1955

Other bibliographies in preparation are:

Actinometers
Arctic Synoptic Meteorology
Climate of the Arctic
Cosmic Rays in the Atmosphere
Fog Forecasting
Indoor Climatology
Microwave Propagation
Night Airglow
Ocean-Atmosphere Energy Exchange
Ozone
Singularities
Snow Cover
Synoptic Aerology
Tropical Cyclones

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue cumulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
!	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACT OF CURRENT MATERIAL

TEXTBOOKS, MONOGRAPHS AND REVIEW ARTICLES

6.3–1 551.574.1(02) 551.594.2(02)

†Shishkin, N. S., **Oblaka, osadki i grozovoe elektrichestvo.** [Clouds, precipitation and thunderstorm electricity.] Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoĭ Literatury, **1954.** 280 p. 82 figs., 21 tables, 156 refs. **DLC**—An important monograph or text on various aspects of cloud physics and thunderstorm electricity. The work reported is based on original Russian as well as on "western" research up through 1953 (in the list of 156 references, 93 are from native Russian and 63 from foreign sources). In the introduction, the author critically reviews the various theories of cloud physics and rain formation (i.e., FINDEISEN-BERGERON, BOWEN, LANGMUIR, etc.), then in Ch. I takes up the dynamic and thermodynamic processes in water-vapor transfer and cloud formation, cloud forms, and precipitation types; Ch. II, the methods of cloud and rain drop, and water content measurement; Ch. III, the microstructure of cloud, and radar measurements; Ch. IV, laboratory research on growth, evaporation and freezing of cloud drops, and crystal growth; Ch. V, on condensation and sublimation as factors in cloud particle growth; Ch. VI, on coagulation of various types as factors in particle growth; Ch. VII, changes in phase involved in growth or formation of hydrometeors; Ch. VIII, basic theory of convective clouds, thunderstorms and hail; Ch. IX, electrical fields in clouds and Ch. X, basic theory of thunderstorm electricity. The book contains a great deal of theory, and quantitative data in the form of tables and curves, scatter diagrams and histograms. The illustrations of radar scope views are taken from U. S. material, but most of the illustrations are from USSR sources. *Subject Headings:* **1. Cloud physics 2. Thunderstorm electricity 3. Textbooks.**—*M.R.*

6.3–2 551.515.8(02)

Flora, Snowden Dwight (*Retired, U. S. W. B. Topeka, Kan.*), **Tornadoes of the United States.** [Rev. ed.] Norman, Oklahoma, Univ. of Oklahoma Press, **1954.** 221 p. tables, figs., photos, refs. throughout. **DWB**—Although the first edition of this interesting book was published only a year ago, so much more data on tornadoes has accrued during 1953 that many chapters had to be revised and the statistical section enlarged so that the new edition has about 25 pages more than the old (*see item* 4.8–8, Aug. 1953, *MAB*). The section on forecasting gives the facts and consequences of warnings issued by the Weather Bureau prior to the San Angelo and Waco, Texas and the Cleveland, Ohio tornadoes of 1953. Full descriptions of these and the Flint, Mich. and Worcester, Mass. tornadoes are given in the chapter on **Outstanding disasters.** The 1953 data (and some for 1950–52 not included in the first edition) are added to the state-by-state summary and to the overall statistical tabulation. Mention is also made in a chapter on **Protection against tornado damage** of facts regarding safety and minimum damage incurred in modern steel-reinforced concrete structures compared with cheap or old-style. *Subject Headings:* **1. Tornadoes 2. Tornado damage statistics 3. United States 4. Textbooks.**—*M.R.*

6.3–3 551.594

†Chalmers, J. Alan, **Atmospheric electricity.** *Physical Society of London, Reports on Progress in Physics*, 17:101–134, **1954.** refs. **DWB**—This comprehensive survey covers subjects in which there have been recent advances. "Ionization in the atmosphere" includes formation of small ions and "kernels," a term proposed by author for "condensation nuclei" (German *Kern*), combination coefficients, equilibrium, changes, sizes, etc. Pt. 3 deals with fine weather fields and currents, including methods of measurement and change with height. Pt. 4 covers point discharge currents, Pt. 5 precipitation currents, including fields and currents in fog and mist. Pt. 6 discusses the maintenance of the earth's charge, relations of variation

of field with frequency of thunderstorms, including a new estimate (2200–3600) of storms in progress at any time. Pt. 7 describes development and electrical investigation of thunderclouds and recent work on lightning. In Pt. 8 theories of origin of cloud charges are considered. *Subject Heading:* **1. Atmospheric electricity.**—*C.E.P.B.*

6.3–4 551.5:51(02)

†Courant, Richard and Hilbert D., **Methods of mathematical physics, v. 1.** First English edition, trans. and rev. from the German original. New York, Interscience Publishers, **1953.** 561 p. figs., foot-refs., bibliog. at end of each chapter, bibliog. p. 547–550, numerous eqs. **DWB**—Advanced mathematical methods which are essential in modern physics and physical meteorology, are set forth in systematic manner in this classic textbook which first came out in 1924, but was completely revised in 1930 and 1938. The well-known techniques of Fourier analysis, Poisson's integral, calculus of variations, vibration and Eigen-value problems, Green's function, Bessel functions, Laplace spherical harmonics, vector analysis, calculus of perturbations, Enler integrals, Hermite equations, Hilbert space, etc., application to particle analysis, turbulence, momentum and wave problems, Fourier transforms and vector problems of all types are obvious. *Subject Headings:* **1. Mathematical physics 2. Physical meteorology 3. Textbooks.**—*M.R.*

6.3–5 551.521(02)

Heitler, Walter, **Quantum theory of radiation.** 3d ed. Oxford, Clarendon Press, **1954.** 430 p. numerous figs., refs., eqs. **DWB**—A useful text for anyone wishing to get background information on modern radiation theory. Pt. I deals with classical theory of radiation, Pt. II, with quantum theory of pure radiation, Pt. III, with the electron field and its interaction with radiation, Pt. IV, with the solution of perturbation theory and damping theory, Pt. V, with emission absorption, scattering, Bremsstrahlung, etc. in first approximation, Pt. VI, with radiative corrections, VII, with penetrating power of high-energy radiation (γ-rays, fast particles and cascade showers). Theoretical details are found in the extensive appendixes. Author and subject indexes are included. The third edition is considerably expanded from the first and second. *Subject Headings:* **1. Radiation theory 2. Cosmic radiation theory 3. Textbooks.**—*M.R.*

6.3–6 551.515(04)

†Lane, Frank Walter, **The elements rage.** London, Country Life, Ltd., **1945.** 188 p. 46 photos, bibliog. p. 176–183. **DWB.** Also his: **Wenn die Elemente wüten.** [When the elements rage.] Zürich, Orell Füssli Verlag, **1952.** 212 p. 62 photos. Trans. by Magda H. Larsen of: The elements rage. **DWB**—A vivid and scientifically accurate popular work on the most spectacular elements of the weather: hurricanes, tornadoes, waterspouts, hail, snow, lightning, meteorites, earthquakes, volcanoes, with striking full page illustrations of each—mostly from United States and British sources. The German translation contains a number of extra illustrations of recent events, but has omitted the excellent bibliography of about 300 references to the above subjects and the index, which appeared in the original work. *Subject Headings:* **1. Popular science books 2. Atmospheric disturbances 3. Diasters 4. Translations. I. Larsen, Magda H.** (*trans.*).—*M.R.*

6.3–7 551.582:631.9(234.3)

†Monheim, Felix, **Agrargeographie der westlichen Alpen mit besonderer Berücksichtigung der Feldsysteme.** [Agricultural geography of the western Alps with special regard to the field system.] *Petermanns Geographische Mitteilungen, Ergänzungsheft,* 252, **1954.** 136 p. 5 figs., 39 photos., 9 charts, 16 tables, 153 refs. **DLC**—This memoir begins with an analysis of the bases of agriculture in the western high Alps. After relief and soil the main factor is amount of rain and snow (400–>2500 mm a year) which is discussed in detail with a folding chart. Temperature is also important; monthly means and maxima are tabulated for a number of stations and some black-bulb figures quoted. The effects of height and aspect on vegetation period and the agricultural calendar are considered, and the distribution of natural vegetation and settlement described. Pt. II deals with distribution of types of culture, Pt. III with the height limit of grain crops. In Pt. IV the general crop sequence and field system are de-

scribed, including effect of droughts. Pt. V goes into regional details, synthesized in Pt. VI. Pt. VII discusses tendencies to change. *Subject Headings:* **1. Agricultural climatology 2. Agronomy 3. Alps.**—*C.E.P.B.*

6.3–8 551.5(03)

†Schindler, Gerhard, **Meteorologisches Wörterbuch.** [Meteorological glossary.] Wels, Austria, Leitner, **1953.** 131 p. 116 figs., 25 photos, 198 refs. **DWB**—This handy glossary of about 1890 German terms contains a great many terms not found in other glossaries as well as those which are standard; the definitions, although competent, are not as lengthy as one usually finds. Numerous illustrations and schematic diagrams are provided to amplify the verbal definitions. Authorities are not given in each case, but a list of 198 references to books, periodicals and articles used in making definitions is appended. The many new terms used in bioclimatology, mountain meteorology (special winds in all parts of the earth), radio meteorology, weather lore, study of singularities, long range forecasting, atmospheric optics and other special fields of interest to the author are well represented. The text was completed in 1946, but was revised somewhat to bring it up to date of publication. *Subject Headings:* **1. Meteorological glossaries 2. Glossaries 3. German language.**—*M.R.*

6.3–9 551.556.3:621.311.24

*Studiengesellschaft Windkraft e. V., Stuttgart, **Unterlagen über die Verteilung der Windgeschwindigkeit in Deutschland für Fragen der Windkraftnutzung.** [Records on the distribution of wind velocity in Germany for wind power exploitation.] Its *Mitteilungen*, No. 3, April 1, **1954.** 107 p. graphs, diagrs. **DWB**—Wind data for 50 stations in western Germany are thoroughly analyzed and presented in graphical and tabular form with respect to use in wind power projects. The sites of each station are described and shown on charts of surrounding topography, etc. Stations having the most wind power available are mentioned in the introduction. Mountain, coastal and urban locations are included. Variations within urban regions also are shown. *Subject Headings:* **1. Wind power data 2. Wind variations 3. Wind power projects 4. Western Germany. I. Germany. Deutscher Wetterdienst II. Caspar, Werner** (*ed.*).—*M.R.*

6.3–10 551.515.4

*World Meteorological Organization, **World distribution of thunderstorm days. Repartition mondiale des jours d'orage. Part 1, Tables.** *World Meteorological Organization, OMM*, No. 21, TP 6, **1953.** 204 p. almost entirely tables. In English and French. **DWB**—This publication lists average number of thunderstorm days (for entire period of record as stated) for each month, season and for the year, for 4000 stations in 90 countries, listed by continents (WMO regions), by countries and geographically (by lat. and long. belts) in each country (with coordinates of each station given). The volume is intended as an extension or supplement to the monograph published by C. E. P. Brooks in *Great Britain. Meteorological Office. Geophys. Memoirs*, no. 24:147–164, **1925** (*see* 4K–37, Nov. 1953, *MAB*), and is intended for the use of researchers in sferics, etc. The data do not give any indication of the number of lightning strokes or thunderstorms, or their severity or the diurnal frequency, but merely the number of calendar days on which thunder was reported on a midnight to midnight basis. Kampala, B. E. A., has 242 days/yr. *Subject Headings:* **1. Thunderstorm frequency data 2. Global thunderstorm distribution. I. Brooks, C. E. P. II. Swoboda, G. III. Lugeon, Jean.**—*M.R.*

6.3–11 551.556.2 551.582.2(783/4)

*George, Ernest J. (*U. S. Bur. of Plant Industry, Soils and Agricultural Engineering*), **Thirty-one-year results of growing shelterbelts on the Northern Great Plains.** *U. S. Dept. of Agriculture, Circular*, No. 924, Aug. **1953.** 57 p. 6 tables, 26 figs., 23 refs. Price: 25 cents at Govt. Print. Off., Wash., D. C. **DWB**—This circular summarizes efforts to establish wind- and snow-breaks in the Dakotas during the period 1914–1946. The climatic conditions during this period are briefly summarized, with special emphasis on the period 1914–1919 when such a large proportion of the young seedlings died (>50%). Great loss was also experienced in the drought years 1931–1936. Moisture considerations are paramount in a region which

averages only 13 to 16 in. a year. Rain does little good, but heavy snows are effective in conserving moisture. Winter killing of young trees is serious where temperature range is 180° in a year. *Subject Headings:* **1. Shelter belts 2. Climate of the Dakotas 3. South Dakota 4. North Dakota 5. Northern Plains, U. S.**—*M.R.*

6.3–12 551.57

*Mather, John R., (*ed.*), **Measurement of potential evapotranspiration.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(1), **1954.** Contract AF 19(604)-193, Scientific Report, No. 2; Contract AF 19(604)-289, Scientific Report, No. 8. 225 p. numerous figs., refs. and tables. **DWB**—Results of evapotranspiration measurements made in several climatic regions of the world from 1947–1953 are reported in this collection of papers by various authors as well as by JOHN R. MATHER and C. W. THORNTHWAITE of Seabrook, N. J. M. J. GILBERT reports on measurements in North Carolina; D. E. MCCLOUD and L. S. DUNAVIN on studies at Gainesville, Fla.; MARIE SANDERSON at Toronto, Windsor and Norman Wells in Canada; V. H. GUERRINI in Ireland; C. S. RAMAGE in Hong Kong; G. W. SMITH in Trinidad; and B. J. GARNIER in Nigeria. Critical examination is made of the accuracy of the evapotranspirimeter (which has undergone improvements in the course of the years) and the efficiency of the Thornthwaite formula. It is suggested that the formula be simplified for computation purposes. Daily accumulated values are given in tables and graphs. Each of the 14 papers presented herein have been abstracted separately. (*See items:* 5.6–197, June 1954; 6.2–238 and 6.2–239, Feb. 1955, *MAB* for those previously published.) *Subject Headings:* **1. Potential evapotranspiration 2. Evapotranspiration data 3. Seabrook, N. J. 4. Canada. I. Johns Hopkins Univ. Laboratory of Climatology II. Contract AF 19(604)-193 III. Contract AF 19(604)-289.**—*M.R.*

6.3–13 551.46:551.582(26)

*Wüst, George; Brogmus, Willi and Noodt, Eberhard, **Die zonale Verteilung von Salzgehalt, Niederschlag, Verdunstung, Temperatur und Dichte an der Oberfläche der Ozeane.** [The zonal distribution of salinity, precipitation, evaporation, temperature and density at the surface of the oceans.] *Kieler Meeresforschungen*, Kiel, 10(2):137–161, **1954.** 10 figs., 14 tables, 38 refs. **DWB**—A tremendous amount of calculation has gone into this new study of the zonal distribution of salinity, precipitation, evaporation temperature and density of all the oceans. The material was worked up by 5° latitude belts and the world wide distribution of these elements shown on tables and graphs by 5° belts of latitude from 0° to 90°N or S, for the Atlantic, Pacific and the seas of the world, including the bordering seas. Values thus obtained are compared with those published by KRÜMMEL in 1907, and remarkable agreement is evident for Atlantic and Pacific and the oceans as a whole, with the exception of the Arctic and Antarctic. The data are presented in numerous ways to show relationships; integrated values (for world as a whole) of each element are also presented. The discussion embraces a critical review of the interaction of the heat and moisture budget of the oceans, as well as of the work done at the Kiel Oceanography Institute since 1950. *Subject Headings:* **1. Ocean-atmosphere interaction 2. Oceanographic data 3. Marine climatology 4. Oceans.**—*M.R.*

6.3–14 551.509

Reuter, Heinz (*Vienna Univ., Austrian Met. and Geodynamics Central Office*), **Methoden und Probleme der Wettervorhersage.** [Methods and problems of weather forecasting.] Vienna, Spring-Verlag, **1954.** 161 p. 46 figs., 73 refs., numerous eqs. **MH-BH**—The theoretical and empirical foundations of weather forecasting and their application in practice as developed in the United States and Europe are treated with a minimum of mathematics. A knowledge of the fundamental equations of motion and continuity is presupposed. The section dealing with mathematical weather forecasting is the most mathematical section in this book. The contents of the book are as follows: analysis of the pressure field and pressure field changes, absolute and relative topography of pressure surfaces aloft, frontal analysis and the zonal index; kinematic analysis of the pressure field; linkage of the pressure fields at surface and aloft, and the steering of the atmospheric pressure configuration; origin and development of low pressure regions; construction of forecast charts; theory of mathematical weather forecasting and the preliminary calculation of the pressure distribution through

numerical integration and forecasting the actual weather and testing the validity of the forecast. *Subject Heading:* **1. Weather forecasting.**—*I.L.D.*

6.3–15 551.509.33

†Van der Bijl, W., **Weers verwachtingen op lange termijn.** [Extended weather forecasting.] *Netherlands. Meteorologisch Instuut, Verspreide Opstellen,* 1, **1954.** 128 p. numerous illus., bibliog. p. 126–128. **DWB**—A popular account of scientific and pre-scientific weather forecasting with special emphasis upon the theoretical foundations and methods of extended forecasting developed in the 20th century. After a discussion of the economic importance of long range weather forecasting, of popular weather maxims which purportedly are useful in extended forecasting, of long range forecasting in antiquity, in the Middle Ages and during the interval 1600–1900, the author discusses the developments in the 20th century. A few examples of contemporary non-scientific extended forecasting such as almanac forecasting in the Netherlands are cited. The various scientific methods are briefly discussed; these include regression equations, symmetric atmospheric pressure distribution, singularities, trends in atmospheric pressure—long waves in the general circulation; paths of low and high pressure areas; solar phenomena. Methods in use in India, Indonesia, the Soviet Union, Germany, the Netherlands, France, Great Britain, the United States and Japan are described. A short but very selected bibliography is included. *Subject Heading:* **1. Extended forecasting.**—*I.L.D.*

GENERAL METEOROLOGY

6.3–16 551.5(05)

Belgium. Institut Royal Météorologique, **Publications,** No. 1, **1952.** Brussels, pub. by the Institute. Title-page in French and Flemish; text in English. **DWB**—A new series devoted to original contributions, characterizing the activity of the Institute, while the "Contributions" of the Institute contain reprints and summaries of papers, published previously elsewhere. *Subject Headings:* **1. Serial publications 2. Belgium.**—*A.A.*

6.3–17 551.5(08)

[Royal Meteorological Society], **Nekotorye problemy sovremennoĭ meteorologii. Sbornik stateĭ pod redaktsieĭ D. Brenta.** [Some problems of modern meteorology. Collection of articles edited by D. Brunt.] Tr. From English into Russian by T. P. Belinskiĭ. Ed. by B. I. Izvekov. Leningrad, Gidrometeorologicheskoe Izdatel'stvo, **1937.** 170 p. illus., bibliogs. At head of t-p: Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby SSSR. **DLC.** This is a translation of Royal Meteorological Society, **Some problems of modern meteorology. A series of papers by various authors reprinted from the Quarterly Journal of the Royal Meteorological Society.** Introd. by D. Brunt. London, Pub. by the Society, **1934.** 170 p. illus., bibliogs. **DLC**—The papers were taken from the Quarterly Journal of the Royal Meteorological Society, 1931–34, and are articles on radiation, ozone, climatic change, general circulation theory, theory of cyclones, short and long range forecasting, turbulent movements in atmosphere, antarctic meteorology, transformation of energy, condensation of water, vapor and rain or cloud physics, by Brunt, Gold, Normand, Kidson, C. E. P. Brooks, Douglas, Dobson, etc. *Subject Headings:* **1. Compendiums 2. Translations. I. Brunt, David** (*ed.*) **II. Belinskiĭ, T. P.** (*trans.*).—*M.R.*

6.3–18 551.5(09)

MacKaye, Milton, **We're cracking the secrets of weather, Pt. 1.** *Saturday Evening Post,* Philadelphia, 227(11):34–35, 80, 84, 88–89, Sept. 11, **1954.** Pt. 2, *Ibid.,* 227(12):36, 146–150, Sept. 18, **1954.** photos. **DLC**—The more spectacular events in the recent development of weather science are reviewed. The highlights featured in the survey (supported by names and figures) are long range forecasting, weather modification, automatic weather stations, jet stream forecasting, the U. S. Navy's Transosonde project, ocean and Arctic weather stations, upper air research by rockets, precipitation observation and storm tracking by ground or airborne radar, the WBAN project for mechanical forecasting, etc. The photographs show meteorologists at work in their various fields of action. *Subject Heading:* **1. Progress in meteorology.**—*G.T.*

6.3–19 551.5(09)

Seydl, Otto, **Meteorologické zprávy strarých kronik.** [Meteorological reports in early chronicles.] *Meteorologické Zprávy*, 6(2):57–60, May 1953. Reviews of works by A. STRNAD and W. KATZEROWSKY. STRNAD wrote a chronological list of natural phenomena in Bohemia as described in early chronicles (633–1700). The 260-page work was published in 1790. KATZEROWSKY (1871–1901) published a number of similar works, mostly based on sources of the 16–18th centuries, related to observations of weather events in Litomeřice (Leitmeritz), Bohemia. *Subject Headings:* **1. Historic weather records 2. Bohemia, Czechoslovakia.**—*G.T.*

6.3–20 551.5:06(492)

Centenary of Royal Netherlands Meteorological Institute. *World Meteorological Organization, WMO Bulletin*, 3(2):70–71, April **1954. MH-BH**—On Jan. 30, 1954 the Royal Netherlands Met. Institute (KNMI) celebrated its 100th anniversary. In 1854, under C. H. D. BUYS BALLOT, the Institute operated with a staff of 4 scientists and 6 observers and clerks at Utrecht. The first department was that of Maritime Meteorology. In 1897 the Institute moved to De Bilt where it now occupies several large buildings. C. J. WARNERS is now Director in Chief. Details of the ceremony and a picture of the Institute (taken from the air) are included. *Subject Headings:* **1. Netherlands. (K.) Meteorologisch Instituut Centennial 2. De Bilt, Netherlands. I. Warners, C. J. II. Buys Ballot, C. H. D.**—*M.R.*

6.3–21 551.5:06(09):550.3:06(09)

Fleming, John A., **Origin and development of the American Geophysical Union, 1919–1952.** *American Geophysical Union, Transactions*, 35(1):5–46, Feb. **1954.** 2 figs., photos, tables. **MH-BH**—The American Geophysical Union has developed since 1919 until by 1952 it had nearly 5000 members. It is sponsored by the National Research Council of the National Academy of Sciences and is representative for the U. S. for Geophysical Sciences with the International Union of Geodesy and Geophysics of the I.C.S.O. Eight sections (Geodesy, Seismology, Meteorology, Terrestrial Magnetism and Electricity, Oceanography, Volcanology, Hydrology and Tectonophysics) represent the fields of geophysics which the A.G.U. endeavors to coordinate and foster. History of the A.G.U. since 1918 when a committee to form an American section of the proposed I.G.U. (now I.U.G.G.) was formed, persons prominent in its development, etc. are outlined. A list of 27 regional meetings (in the Far West) and of early members is included. *Subject Headings:* **1. American Geophysical Union 2. History of geophysical organizations.**—*M.R.*

6.3–22 551.5:06

George, J. J., **On "Weather is the nation's business."** *American Meteorological Society, Bulletin*, 35(2):43–47, Feb. **1954.** Also: **Report of the Advisory Committee on Weather Services.** *Weatherwise*, 7(1):17–19, Feb. **1954. MH-BH**—(1) A discussion by the chairman of the U. S. Dept. of Commerce Advisory Committee on Weather Service of the reactions of the "Report" (*see item* 5.11–5, Nov. 1954, *MAB*) and the problems encountered by the committee on making the extensive investigations in various parts of the United States during the latter part of 1953. Comments are made on the role of private vs. government meteorology, and the responsibilities of the profession. (2) A condensation of report issued in Dec 1953 by the Advisory Committee headed by J. J. GEORGE (of Eastern Air Lines). This Committee met six times between June and November 1953, and visited major Weather Bureau stations, centers and installations all over the U. S. The report of the Undersecretary of Commerce outlined the functions of an up-to-date national Weather Service as visualized by the Committee, and made several strong recommendations with respect to centralization, personnel policies, leadership, research, forecasting, climatology and relations with private meteorologists. The present Chief, F. W. REICHELDERFER, was highly praised for his leadership under budgetary handicaps. *Subject Headings:* **1. U. S. Weather Bureau reorganization 2. Meteorological services 3. U. S. Advisory Committee on Weather Services 4. U. S. Weather Service 5. United States.**—*M.R.*

6.3–23 551.5:06(43)

Meteorological service of German Federal Republic. *World Meteorological Organization, WMO Bulletin*, 3(3):101, July **1954.** fig. **MH-BH**—Brief description of the activities of the

weather service of the German Federal Republic including locations of regional weather services, types and number of stations and research work conducted. *Subject Headings:* **1. German Meteorological Service 2. Germany.**—*I.L.D.*

6.3–24 551.5:06

La IX^e Assemblée générale de l'Union Géodésique et Géophysique Internationale. [Ninth conference of the International Union of Geodesy and Geophysics.] *Ciel et Terre*, 68(1/2):1–28, Jan./Feb. **1952.** photos. **MH-BH**—The report includes the program of events connected with the conference held at Brussels from Aug. 20 to Sept. 1, 1951, such as meetings, social gatherings, sightseeing tours, an exhibition of instruments, musical features, etc. Meetings were held by the International Associations of Geodesy, Seismology, Meteorology, Terrestrial Magnetism and Electricity, Oceanography, Volcanology and Hydrology. The activities of these groups during the conference, titles of lectures, text of content of resolutions and other details are given. Pictures of participants are presented. *Subject Headings:* **1. Conferences 2. International Union of Geodesy and Geophysics.**—*G.T.*

6.3–25 551.5:06

Rivet, J. R. (*WMO Secretariat*), **Meteorology in the South-West Pacific.** *World Meteorological Organization, WMO Bulletin*, 3(2):47–52, April **1954. MH-BH**—Account of meeting of Regional Association V at Melbourne Univ. Feb. 19–28, 1954 under the presidency of M. A. F. Barnett, Director of the New Zealand Meteorological Society. Important considerations were meteorological observations, networks, hours of observations, codes, telecommunications. Four analysis centers were selected for the Region: 1) Melbourne, 2) Djakarta, 3) Mendi, Fiji and 4) Wellington. Many other matters were taken up. Twenty seven delegates attended. *Subject Headings:* **1. WMO. Regional Association V, South-West Pacific 2. WMO. meetings.**—*M.R.*

6.3–26 551.5:06(914)

Santos, Leoncio, **Seven years ago.** *Philippines. Weather Bureau, The Elements*, 3(7):9, 16, July **1952.** Salvador, Manuel C., **Filipinization of the Weather Bureau.** *Ibid.*, p. 16. **DWB**—Recent developments in the history of the Philippine Weather Bureau are reviewed: (1) the Bureau's re-constitution on July 24, 1945 after its almost complete destruction by war and some of the results achieved since that date and (2) the appointment of M. Lachica (during the war) and C. del Rosario (in April 1947) as first and second Filipino directors of the Bureau and E. Parulan as "in-charge" after the Bureau's re-constitution. *Subject Heading:* **1. Philippine Weather Bureau.**—*G.T.*

6.3–27 551.5:06 55:06

Schweizerische Gesellschaft fvr Geophysik, Meteorologie und Astronomie, Bern, Aug. **1952.** [**Resumes of papers.**] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, **1952.** p. 107–130. Papers in French, English or German. refs. **DWB**—Summaries of 20 papers dealing with the diurnal course of vapor pressure, temperature amplitudes, local mountain climate, extended forecasts, sunshine duration, minimum temperature forecasting, fog waves, thunderstorm maps, radar and sferics observations, radiosondes, photogrammetric snow measurements, photometric calibration, solar rotation, geophysical and seismic observations and sunspot effects. *Subject Headings:* **1. Conferences 2. Meteorology 3. Geophysics 4. Switzerland.**—*A.A.*

6.3–28 551.5:06(41)

Sutton, O. G., **The Meteorological Office and the Commonwealth.** *Royal Society of Arts, Journal*, 102(4932):786–797, Aug. 20, **1954.** 6 figs. Discussion p. 796–797. **GB-MO**—Describes the organization of the British Meteorological Office and the public services it renders. Other sections deal with technique of upper air observations, especially radarsonde, aviation services in cooperation with the Commonwealth, the Falkland Islands Dependencies service, training of meteorologists and research. In reply to a question, author described the work on climatology and microclimatology. *Subject Headings:* **1. British Meteorological Office 2. Meteorological services.**—*C.E.P.B.*

6.3–29 551.5:06(09)

Weightman, R. H., **Establishment of a national weather service—who was responsible for it.** Wash., D. C., U. S. Weather Bureau, **1952.** 35 p. **DWB**—No one person was responsible for the establishment of the national weather service in the U.S.A., but, as this carefully documented account shows, the joint efforts and influence of several outstanding persons over a period of 20 years or more (1850–70) resulted in the final passage of the bill by Congress in 1870, to establish the Weather Service under the U. S. Signal Corps. The author of the bill (H.R. 143), Congressman PAINE of Milwaukee, was a friend of LAPHAM who maintained a storm warning service on the Great Lakes, and had studied under LOOMIS. The ground work laid by ESPY, MAURY, HENRY and others is not overlooked. A long chronology of events and works 1644–1872 is appended in support of text. *Subject Headings:* **1. U. S. Weather Service 2. History of U. S. Weather Service. I. Payne, Halbert E.**—*M.R.*

6.3–30 551.5:778

Baines, H. and Goddard, S. C., **Photography and meteorology, Pt. 1–2.** *Weather*, 9(2):37–41, Feb. 1954 and 9(3):74–80, March **1954.** fig., 3 photos., 23 refs. **MH-BH**—I. Description of Boys camera, results of lightning photography and other applications of photography to lightning research. Also cloud and whole-sky photography. II. Describes photographic photometers and spectrometers (including rocket research, auroral and night airglow spectra) and study of cosmic rays by tracks in packets of photographic plates. Several other uses are mentioned. *Subject Headings:* **1. Meteorological photography 2. Whole sky photography.**—*C.E.P.B.*

6.3–31 551.5:06 55:06

Sans Huelin, Guillermo, **Año geofísico internacional 1957–1958.** [International Geophysical Year 1957–1958.] *Revista de Geofísica*, Madrid, 12(46):157–161, April/June, **1953. DLC**—A resume of plans for International Geophysical Year in 1957–58, in general and in specific fields of radio propagation soundings, magnetism, auroras, rockets, ozone and cosmic rays. *Subject Heading:* **1. International Geophysical Year, 1957–58.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METEOROLOGICAL OBSERVATIONS

See also: **Instruments & methods of obs.** (World Met. Org.), 6.3–54; **Zonal index** (Berry, others), 6.3–107; **Radar analysis of precip.** (Gunn, East), 6.3–201.

6.3–32 551.501.7:551.576

Appleman, H. (*Hqs., U. S. A. W. S., Wash. 25, D. C.*), **Design of a cloud-phase chart.** *American Meteorological Society, Bulletin*, 35(5):223–225, May **1954.** 2 figs., 5 refs. **MH-BH**—A method illustrating the use of a raob sounding for determining quickly the phase of a cloud is illustrated; it is applicable principally to layer-type clouds. If the measurements are accurate it is possible to determine the phase of any existing cloud by examining the adiabatic chart from a raob sounding through the cloud. The frost-point temperature is obtained separately with the aid of Table 102 of the Smithsonian Meteorological Tables (6th ed.) or by multiplying the dew-point by 0.9. A different method for testing a single level over a larger area is described. *Subject Headings:* **1. Cloud phase charts 2. Radiosonde observations.**—*I.L.D.*

6.3–33 551.501:551.579.5

van Bavel, C. H. M.; Hood, E. E. and Underwood, N., **Vertical resolution in the neutron method for measuring soil moisture.** *American Geophysical Union, Transactions*, 35(4):595–600, Aug. **1954.** 6 figs., table, 5 refs. **MH-BH**—A source of fast neutrons and a slow neutron detecting device in close proximity have been used to measure the moisture content of soil. The work was done with a 10-mc Ra-Be source and a BF_3-filled counter (2.5×30 cm). Rates varied between 16 and 2 counts per second. The vertical extent of the soil layer contributing

95 pct of the measured counting rate varied from 65 cm with very dry material (4.4 pct water by volume) to 45 cm with saturated material (38 pct water by volume). It has been shown possible, by partial shielding of the counting tube with cadmium foil, to increase vertical resolution, at expense of counting rate. This procedure is not very effective, however. *Subject Headings:* **1. Soil moisture measurement 2. Soil moisture instruments.**—*Authors' abstract.*

6.3–34 551.501.45:551.557

Graystone, P., **Estimation of mean winds and standard deviations at high levels.** *Meteorological Magazine*, London, 83(989):325–329, Nov. **1954.** 4 tables, 2 refs., eqs. **DWB**—At high levels and in jet streams strongest winds are lost. A formula is given for calculating true vector wind and S.D. at one level from those at a lower level, based on correlation between observed values at different levels. A test gave satisfactory results for 150 mb level when up to ¾ of the observations were missing. *Subject Heading:* **1. Upper air wind computation.**—*C.E.P.B.*

6.3–35 551.501.45:551.524.2(73)

Lenhard, Robert W. and Baum, Werner A., **Some considerations on normal monthly temperatures.** *Journal of Meteorology*, 11(5):392–398, Oct. **1954.** 3 figs., 4 tables, 17 refs. **DWB**—In fixing a period of years for normals, series must first be checked for randomness. A test is described: at 7 U. S. stations successive January's are independent, July's doubtful. Tests for normality of distribution and homogeneity are discussed. In general the latest part of the record is the most reliable. Normals for 1901–30, 1901–52, entire record (80 years) and statistical minimum period (10–73 years) are compared; differences are small in Jan. but considerable in July. Effects of trends and quasi-cyclic variations are discussed and extrapolation is shown to be of doubtful validity. *Subject Headings:* **1. Temperature normals 2. United States.**—*C.E.P.B.*

6.3–36 551.501.8:551.515.3(773)

§Huff, F. A.; Hiser, H. W. and Bigler, S. G., **Study of an Illinois tornado using radar, synoptic weather and field survey data.** *Illinois. State Water Survey Div., Report of Investigation*, No. 22, **1954.** 73 p. 29 figs., 3 tables, 11 refs. **DLC**—A most thorough analysis of the meteorological factors attending the tornado of April 9, 1953 which passed just N of Champagne-Urbana, Ill., and of the radar (P.P.I.) photographs which show a tail forming a distinctive curl and "eye" such as had never before been photographed on a radar scope. Not every such tail forms into a tornado curl and possibly numerous tornadoes would not appear as curls or tails on the P.P.I., but it does give an index to activity that coincided with the path of the tornado for a distance of 25 or 30 mi (dozens of P.P.I. photos are included as well as synoptic charts, photos of damage, etc.). *Subject Headings:* **1. Tornado analysis 2. Radar tornado photographs 3. Urbana, Ill.**—*M.R.*

6.3–37 551.501.81:551.574.1:551.576.11

Cunningham, R. M. and Atlas, D., **Growth of hydrometeors as calculated from aircraft and radar observations.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953,** pub. **1954.** p. 276–289. 13 figs., table, 7 refs.) **DWB**—Five cyclonic storms over New England, investigated by flight and ground-radar, are examined for cloud structure and height of hydrometeor growth, and cross-sections are given, with vertical profiles, surface and upper level charts. It is found that "most of the water for growth is derived from the upper levels in the advance portion of a storm, while near the center and to the rear of active storms, most of the water comes from the lower levels and generally from below the frontal surface." *Subject Headings:* **1. Cloud structure 2. Cloud physics.**—*C.E.P.B.*

6.3–38 551.501.81:551.515.2:77

Hunter, Marvin N. (*U. S. W. B., National Airport, Wash., D. C.*), **Simple radar scope photography.** *Weatherwise*, 7(2):38–40, April **1954.** Expensive automatic radar-scope cameras usually interfere with visual observation of the screen, unless a second screen is available. A much more simple, cheap and effective system, which avoids the difficulty

mentioned above is described and the results of photography accomplished during the passage of hurricane "Barbara" up the Atlantic coast from the Carolinas to New Jersey (Aug. 14, 1953) are illustrated. This new system made use of a Brownie target six-16 box type camera with fixed focus, using Super XX film and with a Kodak portrait lense (focal length 42") scotch-taped onto front of camera, and the whole mounted on a step-ladder set up at 3 ft from the screen, using a 10-second exposure (time for one complete sweep). Cost, about $12. *Subject Headings:* **1. Radar scope photography 2. Radar hurricane photographs 3. Hurricane "Barbara" (1953).**—*M.R.*

6.3–39 551.501.81:551.594.221

Jones, R. F., **Radar echoes from lightning.** *Royal Meteorological Society, Quarterly Journal,* 80(346):579–582, Oct. **1954.** 8 figs., 9 refs. **DWB**—Photos are shown of radar echoes from lightning obtained at East Hill by pointing aerial nearly at top of CuNb echoing column. Heights ranged from 17,000 to over 30,000 ft, temperatures −29 to −46°C. It is suggested that many flashes originate at border of negatively charged columns of large particles. *Subject Headings:* **1. Radar analysis of lightning 2. Lightning.**—*C.E.P.B.*

6.3–40 551.501.81:551.509.54:551.557

Ligda, Myron G. H. and Mayhew, William A., **On the relationship between the velocities of small precipitation areas and geostrophic winds.** *Journal of Meteorology,* 11(5):421–423, Oct. **1954.** 4 tables, 10 refs. **DWB**—Previous relations between movements of small precipitation areas ("spawinds") from radar P.P.I. and atmospheric currents showed high correlation; LIGDA's 1953 data were accordingly analyzed by vector correlation of N–S and E–W components, giving coefficients of 0.85 and standard errors of estimate of 12 mi/hr. These compare favorably with balloon winds at 700 mb and may be useful in synoptic analysis. *Subject Headings:* **1. Radar observation of showers 2. Upper air analysis 3. Upper air winds.**—*C.E.P.B.*

6.3–41 551.501.9(211.1)

Rae, R. W., **The problem of establishing and maintaining weather stations in the Arctic.** American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 88–90. **DWB**—The problems described are the establishment of stations in places accessible only by air, water supply, instrumental precautions in extreme cold and snow, measurement of precipitation, theodolite troubles and personnel. *Subject Headings:* **1. Meteorological stations 2. Arctic weather stations 3. Arctic.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Diurnal humidity variations** (Chiazzaro, Gonzales), 6.3–135.

6.3–42 551.506(058)(54)

*India. Meteorological Dept., **India Weather Review, Annual Summary, 1948, Part A, Summary of Weather with Tables.** pub. **1953.** 155 p. almost entirely tables. **DWB, DLC**—Synoptic elements (surface observations) are presented in 20 tables covering annual averages at some 200 stations and detailed amounts at 8–18 stations. Rainfall averages are also tabulated by regional divisions of the country. A summary of weather development during 1948 is added. *Subject Headings:* **1. Observational data 2. Annual reports 3. India.**—*G.T.*

6.3–43 551.506(268.2) 551.590.24

Rodewald, M., **Beobachtungen bei NW-Island im Sommer 1954.** [Observations near NW Iceland in the summer of 1954.] *Wetterlotse,* No. 78:227–231, Nov. **1954.** 3 figs. **DLC**—Ship report with sketch of ice limit June–early July 1954. Daily variation of air and water temperature is shown for July 30 following a storm which drove off the ice. Notes are given on eclipse of June 30. *Subject Headings:* **1. Marine meteorological data 2. Eclipse weather 3. Greenland Sea.**—*C.E.P.B.*

6.3–44 551.506:551.576

Schüepp, Walter, **Des limites subjectives et méthodiques des observations de la nébulosité.** [Subjective and systematic limitations of cloudiness observations.] *Belgian Congo. Service Météorologique, Bulletin Mensuel,* 2(7):3–13, July **1952.** 2 figs., 3 tables, 8 refs. French, German, Dutch and English summaries. **DWB**—During 1951 the author made careful observations of total and of low and intermittent cloud amount at Leopoldville at 7 different times of the day and compared the observations with those made at the synoptic station nearby. The subjective and the systematic errors are shown in tables and graphs. These errors differ with time of day and with cloud type, and amount to from +20% to −5%, and in the case of systematic errors due to the 1949 synoptic code, the conscientious observer makes the greatest systematic error, whereas the careless observer makes the least. *Subject Headings:* **1. Cloud observations 2. Cloud observation errors 3. Cloud codes 4. Observational errors 5. Leopoldville, Belgian Congo.**—*M.R.*

6.3–45 551.506.1(673)

*Angola. Serviço Meteorologico, **Resultados das observacoes meteorologicas no mes de Jan. 1954 . . . de Fev. 1954.** [Results of meteorological observations during Jan. 1954 . . . Feb. 1954.] **1954.** 2 pieces. all tables. Mimeo. **DWB**—This monthly bulletin has a detailed map of Angola on the cover of each issue, with location of each station in network shown thereon. Data covers monthly average and extremes of temperature, relative humidity, cloudiness, precipitation and number of days with thunderstorm, fog and precipitation of various amounts at about 100 stations, and precipitation data only for 70 stations, arranged by districts. Coordinates of each station are given. *Subject Headings:* **1. Monthly data bulletins 2. Climatic data 3. Angola.**—*M.R.*

6.3–46 551.506.1:629.13

*Balasubramaniam, V. (*Reg. Met. Centre, Colaba, Bombay*), **Weather at Ahmedabad and Poona on occasions of "below minima" conditions at Santacruz.** *Indian Journal of Meteorology and Geophysics,* 5(1):80–82, Jan. **1954.** 2 tables. **MH-BH**—Five years of data (1947–51) including 299 occasions when the weather at Santacruz was below minima (205 in southwest monsoon period) were analyzed to find frequency of simultaneous occurrence of bad weather at Poona and Ahmedabad (alternates for Santacruz Airport). Only one occasion of a 5 hour bad spell occurred when conditions were bad at Poona too. Twenty-two occasions of bad weather at Santacruz lasting 12 hours or more (one for 89 hours on July 14–18, 1948) were analyzed, revealing no occasions when visibility was not <1000 yards at the two alternates. Ahmedabad was usually better than Poona on these occasions. On 10% of the occasions, ceilings were low simultaneously at the alternates when Santacruz was bad. Synoptic types which produce the bad spells are analyzed. *Subject Headings:* **1. Flying weather 2. Ceiling and visibility frequencies 3. Santacruz (Bombay Airport), India.**—*M.R.*

6.3–47 551.506.1(427)

*Fernley Meteorological Observatory, Southport, England, **Annual report and results of meteorological observations for 1953.** pub. **1954.** 24 p. tables. **DWB**—A rather elaborate report of administration, a summary of weather during 1953, a description of the observatory, extremes of temperature, wind, rain, etc., and tabular data on air pressure, temperature, grass and soil temperature (1 ft and 4 ft depth), sunshine, cloud (3 times a day), humidity, wind speed and direction, rainfall, evaporation, rainfall by wind directions, direction of rainfall, various phenomena, visibility, atmospheric pollution, diurnal (24 hour) wind direction and speed, rainfall amount and direction, and sunshine. All data are tabulated in much more detail than is usual. *Subject Headings:* **1. Annual meteorological reports 2. Observational data 3. Southport, England. I. Lidster, George A.**—*M.R.*

6.3–48 551.506.1:551.577(44)

*Péguy, Charles P. (*Prof. Phys. Geog., Rennes Univ.*), **Caractéristiques hydrologiques de l'année 1952. Precipitations et écoulement.** [Hydrologic features of 1952. Precipitation and runoff.] *Société Hydrotechnique de France, Annuaire Hydrologique de la France,* **1952.** 23–34. 3 tables. **DWB**—Besides detailed tables and graphs of monthly rainfall (at

16 stations) and maximum, minimum and mean temperatures (at 12 stations) in France, for the year 1952, there is a comprehensive review of the weather conditions throughout France during the various seasons. For the 63 stations where measurements were made, the annual precipitation was 8% above normal for 1901–30, but May–July was excessively dry. At the end of the year (Dec.) there were numerous floods. The graphs show 1952 monthly precipitation compared to period 1920–1952. *Subject Headings:* **1. Annual meteorological reports 2. Precipitation normals 3. France.**—*M.R.*

6.3–49 551.506.1:551.577(624)

*Sudan. Meteorological Service, **Rainfall averages 1921–1950.** *Sudan. Meteorological Service, Pamphlet*, No. 1, Feb. **1954.** 7 p. mostly tables, refs. **DWB**—Data, including station index number coordinates, years of record and averages of rainfall for each month and for year for 202 stations for 30-year period 1921–50. An alphabetical index of stations by provinces is included. Only half of the 440 stations available were used, since 190 are in a dense network in Gezira and some did not have 5 years of record. *Subject Headings:* **1. Precipitation normals 2. Rainfall data 3. Precipitation networks 4. Long period records 5. Sudan.**—*M.R.*

6.3–50 551.506.7(624) 551.521

Goldsmith, P., **Some aircraft and surface meteorological observations made at Khartoum in July 1952.** *Meteorological Magazine*, London, 83(989):329–334, Nov. **1954.** 4 figs., table, 4 refs. **DWB**—Aircraft observations of temperature and frost point up to >300 mb level over Khartoum are plotted as tephigrams with radiosondes from Nairobi and Aden, for July 12, 14 and 15, 1952. The Dobson-Brewer hygrometer worked well. Surface radiation measurements at Khartoum on July 13 and 14 are analyzed into direct solar beam, scattered and reflected solar radiation, and long-wave radiation from atmosphere and ground. *Subject Headings:* **1. Upper air soundings 2. Radiation calculations 3. Khartoum, Sudan.**—*C.E.P.B.*

INSTRUMENT CARRIERS

6.3–51 551.507.1

Nickola, P. W. and Clark, R. B. (*Hanford Atomic Products Operation, Richland, Wash.*), **A portable meteorological mast.** Richland, Wash., General Electric Co., Hanford Atomic Products Operation, Sept. 30, **1953.** 29 p. 7 photos of instruments, diagr. On cover-title: Biophysics Section, Radiological Sciences Dept., General Electric, Hanford Atomic Products Operation, Richland, Washington. **DWB**—This report describes a 42′ portable meteorological mast for use in studying distribution of air-borne particles and associated meteorological parameters (temperature and wind gradients, etc.) in the field. Masts, particle sampling equipment, thermocouples, 6 ammeters, wind direction indicators, soil heat flow meter, scanner, recorder, power system, van, phones, instrument cabinet, pump cabinets, lights and lightning protection are successively described and illustrated. The equipment was tested at the Richland, Washington atomic installation. *Subject Headings:* **1. Mobile weather stations 2. Portable meteorological masts 3. Micrometeorological towers 4. Richland, Washington. I. General Electric Co. Nucleonics Div. II. Contract W-31-109-Eng-52.**—*M.R.*

6.3–52 551.507.2

Frankcom, C. E. N., **Radio weather messages from ships; their practical value.** *World Meteorological Organization, WMO Bulletin*, 3(3):80–86, July **1954. MH-BH**—Specific illustrations of the value of a weather observation made on board a voluntary observing ship of the "selected ship" scheme are presented. These include the post factum examination of the cyclone that struck Lindi, Tanganyika on April 15, 1952; the reporting of an otherwise unrecorded hurricane in the North Atlantic in August 1951; a cyclonic storm in the Arabian sea in Oct. 1949, etc. A chart showing the ocean areas covered by weather bulletins for shipping is included. *Subject Headings:* **1. Marine meteorological observations 2. Weather ships.**—*I.L.D.*

6.3–53 551.507.362:551.510.534:551.524.7

Johnson, Francis S., **Rocket observations of atmospheric ozone.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 17–26. 11 figs., table, 18 refs.) **DWB**—Ozone data at White Sands, New Mexico, from UV spectra up to 70 km are compared with umkehr results and show good agreement. Data from two rocket flights above 50 km agree with calculated photochemical equilibrium amounts, including oxygen recombination 3-body process. The solar spectral-irradiance curve outside earth's atmosphere is reconsidered, indicating solar constant of 2.00 cal cm^{-2} min^{-1}. Diurnal and annual temperature variations and cooling rate are calculated and discussed. *Subject Headings:* **1. Rocket soundings 2. Ozone distribution 3. Solar constant.**—*C.E.P.B.*

INSTRUMENTS

See also: **Solar & sky radiation** (Wörmer), 6.3–124; **Voltage discharge & thunderstorm protection** (Stekol'nikov), 6.3–373.

6.3–54 551.508:551.501:06

World Meteorological Organization. Commission for Instruments and Methods of Observation, **Abridged final report of the First Session, Toronto, Aug. 10–Sept. 4, 1953.** *WMO, [Publications]*, No. 19, RP. 9, **1953.** 134 p. Price: Sw. fr. 3.—. **DWB**—Report contains list of 52 delegates, observers, experts, advisors and observers from other organizations who attended the 1953 meeting in Toronto. The agenda, a list of documents, summary of work of session, a list of resolutions and a list of recommendations constitute the body of the report. There were 73 items on the agenda and 203 documents were presented. Work covers all phases of instrumental and observational techniques. Draft technical regulations are appended. *Subject Headings:* **1. WMO. Commission for Instruments and Methods of Observation 2. WMO meetings.**—*M.R.*

6.3–55 551.508.59:551.551

Martinot-Lagarde A.; Fauquet, A. and Frenkiel, F. N. (*Johns Hopkins Univ., Silver Spring, Md.*), **The IMFL anemoclinometer—an instrument for the investigation of atmospheric turbulence.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 19:207–218, Dec. **1952.** figs., refs., 16 eqs. **DWB**—Measuring three pressure differences, the magnitude and direction of the instantaneous wind or water velocity can be recorded by the anemoclinometer, developed at the Institut de Mecanique des Fluides de Lille. A spherical head with holes is connected with a Venturi tube, containing a reference pressure cavity. Three variants of the instrument are described and its theory is given in detail. *Subject Headings:* **1. Anemoclinometers 2. Turbulence measurements. I. Lille, France. Université. Institut de Mecanique des Fluides.**—*A.A.*

6.3–56 551.508.71 551.571.7:551.510.53

Brasefield, C. J., **Measurement of atmospheric humidity up to 35 kilometers.** *Journal of Meteorology*, 11(5):412–416, Oct. **1954.** 6 figs., 5 refs. **DWB**—The "hygristor," a small LiCl resistance radiosonde hygrometer, and its calibration are described. Soundings to 30–35 km show that dew point and mixing ratio frequently increase above tropopause, in agreement with results of Regener and with mother-of-pearl clouds. At 19 km above New Jersey on Aug. 17, 1953, dew point reached −62.5°C and doubtfully increased still further at higher levels. *Subject Headings:* **1. Hygristors 2. Lithium chloride hygrometers 3. Humidity of the stratosphere.**—*C.E.P.B.*

6.3–57 551.508.71

Hofmann, Gustav, **Zur Trägheit des gewalzten Haares nach Frankenberger.** [On the lag of the rolled hair according to Frankenberger.] *Annalen der Meteorologie*, 6(3–4):77–84, **1953/4.** fig., 4 tables, 14 refs., 37 eqs. German and English summaries p. 77. **MH-BH**—The lag coefficient of a rolled hygrometer hair is related to the properties of the hair and the surrounding air. The order of magnitude of the calculated coefficient agrees with that shown

in radiosonde ascents. Above −10°C the lag is due mainly to the resistance of the hair to diffusion and to release of heat of condensation. Below −20°C the main factor is the resistance to the transport of water vapor owing to the slight vapor content of the air, which may cause the lag factor to be as high as 2. *Subject Heading:* **1. Hair hygrometers.**—*C.E.P.B.*

6.3–58 551.508.71

Monteith, J. L., **Error and accuracy in thermocouple psychrometry.** *Physical Society of London, Proceedings, Ser. B,* 67(3):217–226, March 1, **1954.** 3 figs., 12 refs., 24 eqs. **DWB**—A new derivation of the psychrometer equation is given in the form

$$e_s(T') - e = A_p'(T - T'),$$

where T' is the observed wet-bulb temperature and $A' = (K/D)^{1-n}C_p/L(T')E$. Values of A' are given for different rates of aspiration. An expression is derived for the radiation error due to temperature difference between wet-bulb and its surroundings, and other errors are discussed. Aspiration rate is set out for an accuracy of 0.99. It is concluded that the wet-bulb should be as small as possible. *Subject Heading:* **1. Psychrometers.**—*C.E.P.B.*

6.3–59 551.508.765:551.574.7:629.13

Bigg, F. J. and Abel, G. C., **Note on sampling and photographing cloud droplets in flight.** *Farnborough, England. Royal Aircraft Establishment, Technical Note, No. MECH. ENG.* 156, **1953.** 17 p. 14 figs., table, 6 refs. **GB-MO**—An oiled slide apparatus is described for measuring the size and distribution of supercooled water droplets causing icing of airplanes. It includes a sampling pole with 5 oiled slides and a photo-micrographic camera. Calibration and method of operation are described; the apparatus proved reasonably reliable. A number of photomicrographs are shown, including a study of the melting process of ice crystals. *Subject Headings:* **1. Drop size distribution instruments 2. Icing of aircraft.**—*C.E.P.B.*

6.3–60 551.508.765:551.577.3

Rudman, J. and Bigg, F. J., **Some notes on the design and performance of a thermal water content meter for use in clouds.** *Farnborough, England. Royal Aircraft Establishment, Technical Note, No. MECH. ENG.* 145, **1953.** 19 p. 14 figs., eqs. **GB-MO**—A warning indicator of icing conditions consists of two small heated cylinders, one exposed to the airflow and the other sheltered. Free water caught on the exposed cylinder causes a temperature difference between the two. Although efficient as a warning device it is not accurate over a large range of water. *Subject Headings:* **1. Cloud meters 2. Icing instruments.**—*C.E.P.B.*

6.3–61 551.508.77:551.578.46

Fuchs, Alfred, **Über die Verbesserung des Rotations-Zerreissapparates für Schneeproben.** [On an improvement of the rotating borer for snow sampling.] *Zeitschrift fur Gletscherkunde und Glazialgeologie,* 2(2):302–303, **1953.** fig. **MH-BH**—Describes with diagram a new form of J. Schrödl's apparatus for obtaining samples of snow (even loose snow) from different depths. *Subject Heading:* **1. Snow sampling instruments.**—*C.E.P.B.*

6.3–62 551.508.77

Hamilton, E. L. and Andrews, L. A., **Control of evaporation from rain gages by oil.** *American Meteorological Society, Bulletin,* 34(5):202–204, May **1953.** 3 figs., 22 refs. **MH-BH**—The authors conducted an experimental study in order to determine whether rain gages lacking the conventional funnel and inner cylinder, but provided with a layer of oil of given depth, could retain their rain catch without loss for periods ranging from several weeks to several months including intervals of very warm and dry weather. It was found that "a depth of 0.15 in. of oil protects a rain catch in a gage without funnel almost indefinitely under any climatic conditions." *Subject Heading:* **1. Rain gages.**—*I.L.D.*

6.3–63 551.508.77

Isono, Y., **Report of testing the precipitation gauge in which a calcium chloride solution was contained.** *Journal of Meteorological Research,* Tokyo, 4(11):863–870, Feb. **1953.** 10 figs., 4 refs. In Japanese; English summary p. 54. **MH-BH**—Rain gage at Tarobo (foot of

Mt. Fuji) was charged with solution of calcium chloride covered by a film of oil. This was argely successful in preventing freezing except that a density stratification occurred during resh precipitation with weaker solution below tending to freeze. *Subject Heading:* **1. Frost protection of raingages.**—*C.E.P.B.*

6.3–64 551.508.77

Ito, K., **A new type snow gauge (2nd report).** *Journal of Meteorological Research*, Tokyo, 5(2):95–98, March **1953.** 3 figs. In Japanese; English summary p. 95. **MH-BH**—The use of Hellmann's recording snow gage presents several problems, such as mechanical friction, adjustments, etc. To eliminate these difficulties a new type snow gage was designed. In this gage an ordinary pluviograph is in operation, measuring the snow after it has melted in a water tank at 15°C. In this paper the author describes some details of improvement on the gage. A general description of the gage was given in the first report. *Subject Heading:* **1. Snow gages.**—*Author's abstract.*

6.3–65 551.508.77/8

Kunii, K., **On the trial manufacture of some new snow gauges.** *Journal of Meteorological Research*, Tokyo, 5(2):99–102, March **1953.** 5 figs., 3 refs. In Japanese; English summary p. 99. **MH-BH**—To simplify daily observation of snow during winter the author tried to manufacture some new snow gages: 1) Mt. Rose type snow sampler measuring density, hardness, grain of snow, etc. 2) Snow hardness scale; by dropping this instrument from a constant level above the snow surface the hardness of snow can be measured. 3) Snow density meter; this meter made of stainless material of 10 cm length is used with the foregoing snow sampler. 4) Snow thermometer made by series-conjunction of copper-constantan wire with copper wire. *Subject Headings:* **1. Snow sampling instruments 2. Snow thermometers.**—*Author's abstract.*

6.3–66 551.508.77

Nagel, J. F., **New recording rain-gauges.** *Journal of Scientific Instruments*, 31:158–162, **1954.** 6 figs., 10 refs. **DLC**—A daily recording siphoning rain gage (5½ in. diameter) with wind shield is described. The large drum (180 mm diameter) and record made by a fine stylus on waxed paper, give an accuracy of 0.1 mm and 1 min. Another type records for 100 days with accuracy 0.2 mm and 15 min. Theory of siphoning is discussed. *Subject Heading:* **1. Rainfall recorders.**—*C.E.P.B.*

6.3–67 551.508.822:551.521

Grober, K. W., **Der Strahlungsfehler der Radiosonde der DDR.** [The radiation error of the radiosonde used in the German Democratic Republic.] *Zeitschrift für Meteorologie*, 7(10):313–317, Oct. **1953.** 4 tables, 6 refs. **MH-BH**—A doubled radiation protection of the radiosonde has been introduced in East Germany since October 1951. The radiation error as computed as the temperature difference between ascents during the day and the night considering the actual diurnal temperature variation, and was found to be significantly less than before with a single radiation protection. It varies now between zero for the relative topography 500/1000 mb up to 1.2°C for 41/96 mb (before from 0.3 to 2.7°C). It is suggested that a jet-form protection cylinder be used in order to increase the air ventilation around the sensitive element. *Subject Headings:* **1. Radiosonde errors 2. Radiation effects 3. East Germany.**—*A.A.*

6.3–68 551.508.822

Müller, Hans (*Erlangen, Germany*), **Die Radiosonde "Graw H-50." Über Strahlungs- und Streufehler und Vergleiche mit der amerikanischen Sonde AN/AMT-2.** [The "Graw H-50" radiosonde; its radiation and random errors and comparison with the American AN/AMT-2 sonde.] *Germany. Deutscher Wetterdienst. Instrumentenamt Nord, Hamburg, Technische Mitteilungen des Instrumentenwesens*, No. 27, July **1954.** 11 p. 5 tables, fig., 7 refs. **DWB**—A new shield was added to the German H-50 radiosonde for radiation protection. Tables presented in this report include comparative data on simultaneous measurements made with shielded and unshielded sondes. The shield is found to give adequate protection up to the 40 mb level. This is confirmed by comparative data obtained with the

shielded German sonde and the American AN/AMT-2 sonde, the latter considered to be unaffected by radiation. The analysis shows that the German and American sondes yield directly comparable data up to the 40 mb level. *Subject Headings:* **1. Radiosonde comparisons 2. Radiation effects.**—*G.T.*

6.3–69 551.508.822:551.524.7

Scrase, F. J., **Radiation and lag errors of the Meteorological Office radiosonde and the diurnal variation of upper-air temperature.** *Royal Meteorological Society, Quarterly Journal*, 80(346):565–578, Oct. **1954.** 6 figs., 7 tables, 9 refs., 19 eqs. **DWB**—Similar to *Meteorological Research Paper*, No. 836, 1953. (*See* 5.10–76, Oct. 1954, *MAB*.) The shielded thermoelement of the radiosonde may be affected by radiation (direct and reflected from the inner shield) and by air warmed by the shield. The heat transfer for a sonde ascending at 6 m/s and swinging through 60°, and the absorption of radiation for different solar altitudes, are calculated. In 50°N the total error varies from 0.7°C at ground level to 17.3°C at 30 km, where heating of the air in the shield accounts for 65 per cent. The error due to lag is also calculated and found to be generally less than 1°C. These results are confirmed by comparison of temperature during ascent and much faster descent. Some experimental modifications were tried but the only one which showed appreciable improvement was the substitution of white card for aluminum for the inner shield. The results show that up to 15 km radiation errors can account for the whole observed difference between day and night temperatures, but that there is a true diurnal range of about 1.5°C at 20 km. and 3°C at 25 km. *Subject Headings:* **1. British radiosondes 2. Upper air temperatures.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Weather forecasting** (Reuter), 6.3–14; **Extended forecasting** (Van der Bijl), 6.3–15; **Upper air analysis** (Ligda, Mayhew), 6.3–40; **Numerical forecasting** (Sawyer), 6.3–117; **Air flow weather correlations** (Tsutsui, Tsuboi), 6.3–149; **Fog forecasting** (Hyman), 6.3–237; **Runoff forecasting** (Sapozhnikov), 6.3–282; **Planetary influences** (Nelson), 6.3–344; **Solar spectroscopy** (Lagarmilla), 6.3–353.

6.3–70 551.509(04, 02)

§Bugaev, V. A., **Pogoda i ee predskazanie.** [Weather and its prediction.] Moscow, Pravada, **1950.** 29 p. 9 diagrs. **DLC**—A technical text for the layman, covering meteorological and aerological observations, air masses, fronts, cyclones and anticyclones, basic principles of synoptic forecasting and development of methods of short and long range forecasting in the U.S.S.R. Some sample synoptic charts are presented and the situations discussed in the text. The pamphlet was issued in an edition of 85,000 copies. *Subject Headings:* **1. Weather forecasting 2. Synoptic analysis 3. Popular meteorology 4. Meteorology textbooks 5. U.S.S.R.**—*M.R.*

6.3–71 551.509.1

Ockenden, C. V., **Use of "facsimile" for meteorological transmissions.** *Meteorological Magazine*, London, 83(988):303–307, Oct. **1954.** 4 plates, 2 refs. **DWB**—Investigations of facsimile transmission of maps by W/T or teleprinter are described. Latest type of transmitter and recorder and specimens of transmitted charts received at Dunstable are illustrated. The facsimile transmission program is given and future developments discussed. *Subject Headings:* **1. Facsimile map transmission.**—*C.E.P.B.*

6.3–72 551.509.3(213)

Forsdyke, A. G., **Synoptic meteorology in the tropics—a general survey.** *Weather* 9(11):327–334, Nov. **1954.** fig., 2 refs. **DWB**—A clear account is given of the features causing cloud and rain, i.e., convergence zones and shallow troughs (Easterly waves) in the tropics. Winds cannot be deduced from isobars and must be constructed from fitted stream lines. The importance of orographic rain is emphasized. For forecasting diurnal shower the tephigram is important. Tropical cyclone warnings are briefly referred to and application of forecasting mentioned. *Subject Headings:* **1. Synoptic studies 2. Tropics.**—*C.E.P.B.*

6.3–73 551.509.31

§Scherhag, Richard (*Berlin Free Univ., Inst. of Met. and Geophysics*), **Die Arbeitsmethoden des heutigen Wetterdienstes.** [Techniques of current weather services.] *Physikalische Blätter*, Mosbach, Baden, 9(8):351–362, **1953.** 9 figs. **DLC**—By means of a number of upper level and surface synoptic charts for the period Jan. 27–Feb. 1, and trajectories of cold air centers for Jan. 1–Feb. 2, 1953, the author illustrates the most modern methods of synoptic analysis which precede the issue of forecasts. He shows how a center which forms in the Alaska or East Siberian area moves day by day and eventually results in the formation of subsallobaric tendencies over the North Atlantic or hurricanes over the North Sea or Low Countries. *Subject Headings:* **1. Synoptic analysis 2. Synoptic aerological studies 3. North Sea hurricane (Jan.–Feb. 1953) 4. Hurricane formation.**—*M.R.*

6.3–74 551.509.317:551.509.54

Carson, Robe B. (*W. B. Airport Station, Miami, Fla.*), **Some objective quantitative criteria for summer showers at Miami, Florida.** *Monthly Weather Review*, 82(1):9–28, Jan. **1954.** 14 figs., 12 tables, 26 refs. **MH-BH**—An elaborate series of objective or statistical aids are developed and tested for use in predicting July and Aug. showers in Miami, Florida and vicinity. Previous studies are evaluated; showers are divided into 4 types, scatter diagrams and data tables are presented to illustrate objective aids, and the 3 best parameters are selected for use, based on (a) 0300 GMT soundings and (b) 1500 GMT soundings. Higher skill was obtained by objective methods using 1500 data and lower using 0300 data than was obtained by conventional methods. Chief conclusion is that absolute humidity at 850–700 mb is more closely related to summer showers at Miami than humidity at the surface or above 650 mb. The Showalter Stability Index is useful. *Subject Headings:* **1. Summer shower forecasting 2. Thunderstorm forecasting 3. Objective forecasting 4. Miami, Florida.**—*M.R.*

6.3–75 551.509.317:551.576.11

French, J. E. and Johannessen, K. R., **Forecasting high clouds from high-level constant-pressure charts.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 160–171. 9 figs., 2 tables, 13 refs., 7 eqs.) **DWB**—Difficulty of observing high cloud from ground led to use of aircraft observations of extensive sheets of CiSt. above 25,000 ft. These are associated with divergence and vertical motion near tropopause. Examples are discussed in relation to the vorticity advection term at 300 mb, including charts over U. S. and sections along aircraft tracks. Occurrence of extensive overcast increases with vorticity advection term, but 14% occurred with negative vorticity (attributed to persistence of ice crystals). Relations of cloud tops to extra-tropical and tropical tropopause are summarized. *Subject Headings:* **1. Synoptic aerology 2. Cloud forecasting.**—*C.E.P.B.*

6.3–76 551.509.317:551.510.52/3

§Gilbert, Ivan E., **The tropopause thermography as an aid in constructing 500 mb prognostic charts. [1953?]** 26 p. Manuscript. 15 charts, 5 refs. **DWB**—A number of synoptic cases are analyzed from the point of view of 500 mb topography in relation to tropopause height and temperature oscillations. Rides are expected to develop when tropical air, as indicated by cold tropopause, and troughs when Arctic air, as indicated by warm low tropopause, are advected into the regions. A steep tropopause gradient or packed isotherms at the tropopause indicate a jet stream will form at the 500 mb level. Rules for using tropopause "thermography" in the absence of tropopause topography charts which take too long to compile are set forth very explicitly. The cases analyzed are: 1) a fast moving trough, March 4–5, 1952; 2) a cut off low development in the Great Basin on March 19–23, 1952 and 3) development of a sharp trough on March 9–10, 1952—all cases affecting flight plans across the California to Midwest air routes. *Subject Headings:* **1. Synoptic aerological studies 2. Tropopause analysis 3. Upper air wind forecasting 4. Western United States. I. Trans World Air Lines, Inc.**—*M.R.*

6.3–77 551.509.317:551.547:551.524.7

§Holzworth, George C. and Thomas, Charles F. (*WBAN Analysis Center, U. S. W. B., Wash., D. C.*), **Low level warm air advection, June 8–9, 1953.** *Monthly Weather Review*, 81(6):169–178, June **1953.** 23 figs., 6 refs. **MH-BH**—Study based on composite charts of the 100–500 mb thickness and 1000 mb height and their changes, wind hodographs, sounding results up to 500 mb, potential and dew point temperature isopleths for time versus altitude, isentropic charts and 12-hour lift charts in relation to precipitation areas. A nomogram is presented for the computation of the lift, given the slope of the isentropic surface and the component of the normal wind that is not accounted for by the movement of the thickness lines of relative topography. The main purpose of the paper is to show the relationship between the changes in the relative topography and sea level change. The method developed is equally applicable to cold air advection. *Subject Headings:* **1. Advection 2. Relative topography 3. Nomograms 4. Vertical motion.**—*A.A.*

6.3–78 551.509.317:551.557

Sutcliffe, R. C. and Sawyer, J. S., **Forecasting winds up to the 100-mb level by the contour-chart technique.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954, p. 155–159. table, 3 refs.) **DWB**—The present British method of forecasting upper level contours by thickness of individual layers is described, and system of checking by standard vector wind errors set out. Up to 300 mb 24 hr forecast error is significantly less than 24 hr variation, but by 100 mb error is the greater; this is due mainly to radiosonde error and to effect of tropopause. At 100 mb where changes are slow, statistical methods based on observed wind and seasonal normal offer advantages. *Subject Headings:* **1. Synoptic aerology 2. Upper wind forecasting.**—*C.E.P.B.*

6.3–79 551.509.5

Bessemoulin, J., **Quelques aspects du contrôle des prévisions météorologiques et de la nécessité de leur adaptation aux usagers.** [Some aspects of the control of meteorological forecasts and the necessity of their adaptation for the user.] *La Météorologie*, 4th Ser. No. 32:219–244, Oct./Dec. **1953.** 2 figs., table, eqs. French, English and Spanish summaries p. 219. **DWB**—A thorough review of the principles of verification of skill in forecasting from the objective point of view and from the point of view of the public. The economic value of the special forecast may not have any relation to the impression of the person who receives the forecast by radio or telephone. The forecaster may be influenced psychologically by consideration of the number of "malcontents" or of satisfied users, since the population is more concentrated in the plains than in the mountains and some phenomena are more violent but so liable to failure at any given spot that it is "safer" to forecast no occurrence than occurrence also persistence, mean or climatological forecasting "pays off" in terms of number of "malcontents." The statistical aspects of verification are treated at length. *Subject Headings* **1. Forecast verification 2. Forecasting skill 3. Applied meteorology.**—*M.R.*

6.3–80 551.509.5:551.524.

Eldridge, R. H., **Forecasting temperature at 6000 ft. for transatlantic flights.** *Meteorological Magazine*, London, 83(988):313–314, Oct. **1954.** table. **DWB**—A method is described of interpolating temperature at 800 mb from 1000–700 mb thickness in feet. *Subject Heading* **1. Upper air temperature forecasting.**—*C.E.P.B.*

6.3–81 551.509.5

Riehl, Herbert and Teweles, Sidney, Jr., **Rainfall and vorticity advection.** *Journal of Meteorology*, 11(5):425–428, Oct. **1954.** 4 refs. **DWB**—Riehl criticizes statistical tests by Teweles (*J. Meteor.* 10:450–453, 1953) of the relation between precipitation and high tropospheric vorticity (*see item* 3E–238, May 1952, *MAB*) and verifies his own earlier results. Teweles answers the criticisms and emphasizes the restrictions of method. *Subject Headings* **1. Objective forecasting 2. Precipitation forecasting.**—*C.E.P.B.*

6.3–82 551.509.54:551.511

§Wolff, Paul M. and Dickson, Robert R., **Precipitation and vorticity.** U. S. Bureau of Aeronautics (Navy), Project AROWA (TED-UNL-MA-501.13), [unnumbered] Technical Report, Sept. **1953.** 26 p. 16 figs., 5 refs. **DWB**—An attempt to apply recent knowledge of the jet stream and vorticity theory to the problem of precipitation forecasting over ocean areas. The rule that "cloudiness and precipitation should prevail in regions where the relative vorticity decreases downstream along the streamlines and fair weather should prevail where it increases downstream along the streamlines" is tested and illustrated by synoptic examples. Application of this technique requires a prognostic upper-level contour chart and a forecast of the wind field. Further work must be attempted along this line before conclusions are drawn. *Subject Headings:* **1. Precipitation forecasting 2. Prognostic charts 3. Vorticity theory.**—*M.R.*

6.3–83 551.509.58:534 551.596.1

Cox, Everett F.; Plagge, H. J. and Reed, J. W., **Meteorology directs where blast will strike.** *American Meteorological Society, Bulletin,* 35(3):95–103, March **1954.** 6 figs., 3 tables, 12 refs., 27 eqs. **MH-BH**—Successful forecasting of the locations where damage may result from blast waves emanating from (a) TNT or (b) atomic explosion must be based on good forecasts of temperature and wind (and, to some extent, humidity) gradients in the troposphere. Ordinarily pressures from shock waves are reduced to ineffective values at 500 ft (a) or 3.7 miles (b), but focusing of ray paths due to inversions of temperature and humidity or wind shear, may give zones of silence and corresponding areas of abnormal shock. Tables and graphs for computation and illustration of method used by author and collaborators in N. Mex. are presented along with theoretical basis for calculations. Criteria for estimating damage to plate glass or ordinary windows are given. Plate glass is subject to long period oscillations from big blasts as well as to pressures. *Subject Headings:* **1. Bomb blast waves 2. Anomalous sound propagation 3. Shock wave forecasting.**—*M.R.*

6.3–84 551.509.59:551.551:533.15

†Davidson, Ben, **Forecasting diffusion in the lower layers of the atmosphere.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics,* No. 14, Sept. **1952.** 192 p. 103 figs., 23 tables, 43 refs., 38 eqs., sources of illus., p. 189–192. **DWB**—An attempt to present methods of forecasting diffusion in the lower atmospheric layers for direct field use. Ch. 1 is a general introduction to the principles of turbulent diffusion. Ch. 2 deals with numerical solution for ideal ground conditions including steady state solutions, continuous infinite line source and continuous point source located on the ground and instantaneous point and line sources. Ch. 3 presents the application of ideal conditions to real sources and nonuniform terrain. Ch. 4 is concerned with sources located at elevation not exceeding 100 m with the behavior of nonaerosol particulate matter and with the effect of inversions and diurnal variations on ground concentrations. Ch. 5 takes up the analysis of observations (wind and temperature); Ch. 6, the forecasting of variables of turbulent diffusion and Ch. 7, forecasting for nonhomogeneous terrain. The treatment of the subject matter is mathematically and technically simple but nevertheless scientific. Mathematical deviations are presented in the appendix. (*Same item as* 6B–117, Feb. 1955, *MAB.*) *Subject Headings:* **1. Turbulent diffusion 2. Turbulent diffusion forecasting.**—*I.L.D.*

CLOUD SEEDING AND ARTIFICIAL PRECIPITATION

6.3–85 551.509.67

Dessens, H. and Soulage, G., **Nouveaux essais de precipitation des nauges surfondus, hiver 1953–1954.** [New experiments on precipitation from supercooled clouds, winter 1953/54.] *Puy-de-Dôme. Observatoire, Bulletin,* No. 2:43–52, April/June **1954.** 5 figs., 6 refs. **DWB**—During the winter of 1953–1954, when dense and stable stratus clouds were over the Puy de Dôme Observatory, wood charcoal impregnated with silver iodide was burned from 1600 to 2600 hours. Small crystals were precipitated. These crystals were hexagonal plates. Similar results were obtained on other occasions with stratocumulus clouds. Such clear cut

results were not obtained with the use of dry-ice. Possible explanation of nucleation with silver iodide and observations on natural precipitations from a supercooled stratus are discussed. *Subject Headings:* **1. Artificial precipitation 2. Silver iodide.**—*I.L.D.*

6.3–86 551.509.67

*Elliott, Robert K. and Strickler, Robert F. (*N. American Weather Consultants, Santa Barbara Airport, Calif.*), **Analysis of results of a group of cloud seeding projects in Pacific slope watershed areas.** *American Meteorological Society, Bulletin*, 35(4):171–179, April **1954.** 6 figs., 2 tables, 11 refs. **MH-BH**—Statistical analysis of results of cloud seeding in 3 target areas of the Far West (Central Sierras, Southern Cascades and Bitterroots of Calif., Oregon and Idaho, respectively) during 1951, 1952 and 1953, compared with simultaneous precipitation in control areas located near (but not adjacent to) the target areas and to the N and S along the same ranges, shows that excesses of precipitation (or snowpack) in the target areas averaged about 20%, which is significant but not impressive, and varied from −11% to +107% during individual seasons. Poorest results are attributed to possible overseeding or seeding of control area by other projects or by chance drift of AgI from the generators over the control area. *Subject Headings:* **1. Cloud seeding evaluation 2. Cascade Mountains 3. Sierras, Calif. 4. Bitterroot Mountains, Idaho.**—*M.R.*

6.3–87 551.509.67(09)

Schaefer, Vincent (*G. E. Co.*), **Progress in control of meteorological factors.** (In: Pennsylvania Electric Association. Hydraulic Power Committee, **Symposium on climatic trends in Northeastern United States, April 22–23, 1952, Minutes. 1952.** p. 107–120. Discussion, *Ibid.*, p. 121–123.) **DWB**—Review of 5 years of laboratory and field work in experimental meteorology by SCHAEFER and colleagues at General Electric, especially in the fields of cloud physics, rain making, cloud and fog dispersal, study of nucleation and ice crystal growth, etc., at Mt. Washington, Schenectady and in New Mexico. In the discussion he mentions the weekly periodicities in rainfall which LANGMUIR hypothesized. *Subject Headings:* **1. Experimental meteorology 2. Cloud seeding research 3. Progress in meteorology research.**—*M.R.*

PHYSICS AND STRUCTURE OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

See also: **Atmos. humidity meas.** (Brasefield), 6.3–56; **Synoptic-aerological studies** (Gilbert), 6.3–76; **Eddy diffusion** (Lowry), 6.3–105; **Ozone absorption** (Walshaw, Goody), 6.3–131; **Radio-ray in ionosphere** (De Voogt), 6.3–366; **Ionosph. structure** (Ghosh), 6.3–367; **Electron distrib. in ionosphere** (King), 6.3–368; **Ion content & conductivity of atmos.** (Sagalyn, Faucher), 6.3–369; **Elec. conductivity of stratosphere** (McDonald), 6.3–372.

6.3–88 551.510.4:551.521.61:551.583

†Hewson, E. Wendell, **Atmospheric pollution in relation to microclimatology and micrometeorology: some problems.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953. pub. 1954.** p. 240–251. 3 figs., 2 tables, 70 refs. Plass, G. N., **Discussion,** *Ibid.*, p. 251–252.) **DWB**—Estimates are given of annual production and removal of CO_2 and it is possible that 10% increase in CO_2 over past 50 years, which may be due to combustion, may be the one cause of observed climatic warming. Interception of radiation by smoke is insignificant in general climate. Nucleating effects are also probably inappreciable. Evidence that pollution by smoke affects respiratory disease is quoted; effect on cancer is doubtful. Pollution by fungi and pollen (aeroallogens) is more serious; meteorological factors in production and dispersal are discussed and preventives considered. The airborne trajectory of pollen rarely exceeds 10 km. In the discussion, G. N. PLASS supported the theory that the recent climatic change is due to CO_2 from combustion. *Subject Headings:* **1. Atmospheric pollution effects 2. Aerobiology 3. Climatic changes.**—*C.E.P.B.*

6.3–89 551.510.41:551.553:546.21

Nicolet, Marcel, **The aeronomic problem of oxygen dissociation.** *Journal of Atmospheric and Terrestrial Physics*, 5(3):132–140, July **1954.** 4 figs., 2 tables, 17 refs., 11 eqs. **DWB**—An expression for vertical distribution of molecular oxygen is derived, including a parameter X. Rocket observations give a slow decrease in number of O_2 molecules between 108 and 118 km, giving $X=1.28$. Photochemical equilibrium would require $X=2.92$, hence atmospheric mixing or diffusion must be operative. Curves are calculated for number of O_2 mol/cc from 110–350 km for $X=1$ (mixing), 1.28 (diffusion), 3 (photo-equilibrium at 4500°K) and intermediate values. The region 85–120 km is more closely examined under various assumptions. The bearing on the ionosphere is discussed. *Subject Headings:* **1. Atmospheric composition 2. Upper atmosphere 3. Oxygen distribution.**—*C.E.P.B.*

6.3–90 551.510.41:546.17

†Nicolet, Marcel, **Aeronomical problem of nitrogen oxides.** Pennsylvania State College. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report No. 52, Oct. 25, **1953.** 36 p. 44 eqs., 64 refs. **MH-BH**—Considering observational data on atmospheric nitric oxide, it is found that its concentration at any height must be less than $10^{11}cm^{-3}$. From theoretical data obtained from airglow and ionosphere studies, it is shown that its concentration could be of the order of $10^{8}cm^{-3}$ at about 80 km and $10^{6}cm^{-3}$ at about 65 km. In the sun, its abundance is sufficient to give observable electronic bands depressing the ultraviolet solar continuum. The processes in the chemosphere lead to various possibilities with regard to contributions of nitrogen oxides in the airglow. In anticipation of the importance attached to the aeronomical problem of nitrogen oxides in the mesosphere and lower thermosphere, various provisional numerical data are given. *Subject Headings:* **1. Atmospheric composition 2. Nitrogen compounds 3. Airglow. I. Pennsylvania. State College. Ionosphere Research Laboratory II. Contract AF 19(122)-44.**—*From author's abstract.*

6.3–91 551.510.41 546.21

Nicolet, M. and Mange, P. (*Ionospheric Res. Lab., Pa. St. Univ., State Coll., Pa.*), **The dissociation of oxygen in the high atmosphere.** *Journal of Geophysical Research*, Wash., D. C., 59(1):15–45, March **1954.** 11 figs., 9 tables, 35 refs., 49 eqs. **MH-BH.** Also as Pennsylvania. State Univ. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report No. 56, Feb. 1, 1954. **DWB**—The question of the oxygen distribution in the high atmosphere is examined by studying the departure from photochemical equilibrium. An investigation of the transition region is made, utilizing recent rocket data on atmospheric transmission in the Schumann-Runge continuum of molecular oxygen. It is concluded that the molecular oxygen distribution above the dissociation region follows the distribution of the main atmosphere and depends on mixing effects. A limit for the time of mixing can be found when times of dissociation, recombination, and diffusion are considered. It is shown that the level of the mesopause is related to the dissociation of the oxygen molecule. Some suggestions are made concerning dynamical effects affecting the airglow, formation of ionospheric regions, and dissociation of nitrogen. *Subject Headings:* **1. Oxygen dissociation 2. Upper atmosphere. I. Pennsylvania. State Univ. Ionosphere Research Lab. II. Contract AF 19(122)-44.**—*Authors' abstract.*

6.3–92 551.510.41:546.21

*Nicolet, Marcel, **Photochemistry of oxygen.** Pennsylvania. State Univ. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report, No. 61, April 15, **1954.** 65 p. 12 figs., 3 tables, bibliog. p. 64–65, eqs. **DWB**—The aeronomic problem of the dissociation of oxygen is studied quantitatively in the mesosphere and thermosphere. The rate coefficients for various reactions are calculated, and concentrations of ozone, molecular and atomic oxygen are deduced. The way in which departures from photochemical conditions may behave and the differences between day and night time conditions are described. *Subject Headings:* **1. Oxygen dissociation 2. Photochemical reactions in upper atmosphere. I. Pennsylvania. State Univ. Ionosphere Research Laboratory II. Contract AF 19(122)-44.**—*Author's abstract.*

6.3–93 551.510.41:546.214

Smith, Ralph G. and Diamond, Philip, **The microdetermination of ozone.** *American Industrial Hygiene Association Quarterly*, 13(4):235–238, Dec. **1952.** table, fig., 5 refs. **DLC**—Where minute amounts of O_3 are present in a sample (such as in the atmosphere), the various methods of analysis used heretofore which are accurate for large amounts have not proven satisfactory. The author tried more sensitive fluorescein methods but found them too sensitive to other factors. By using the standard KI method, but in alkaline (NaOH) instead of neutral or acid solutions, and spectrophotometric instead of titration analysis, he succeeded in obtaining consistent results from: a) identical samples, b) varying sampling rate by about 400%, and c) varying KI concentration by a factor of 5. The photometry was carried out at 352 mμ. *Subject Headings:* **1. Ozone analysis 2. Spectrophotometric ozone determination 3. Ozone measurement techniques.**—*M.R.*

6.3–94 551.510.41:523.4 551.513

White, Robert M. (*ed.*), **Contributions to the study of planetary atmospheric circulations.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 24, Nov. **1953;** *AFCRC Technical Report*, 53–35. 141 p. 29 figs., tables, refs., eqs. **DLC, DWB**—This volume consists of 12 papers on various aspects of the general circulation of theoretical atmospheres or of the atmosphere of the earth or of Jupiter, and of laboratory model studies of planetary circulations. The separate articles (all dated 1953) are abstracted and published under the names of the authors: V. P. Starr, E. N. Lorenz, H. L. Kuo, R. H. Battin, R. M. White, G. S. Benton and N. E. La Seur, Y. Mintz and S. K. Kao, Starr and Long, R. Shapiro and E. W. Wahl. All work was done under the sponsorship of G.R.D. and its atmospheric analysis laboratory. *Subject Headings:* **1. Planetary atmospheres 2. General circulation 3. Angular momentum flux 4. Eddy transport 5. Compendiums.**—*M.R.*

ATMOSPHERIC POLLUTION

6.3–95 551.510.42

*Andreassen, A. H. M. and Gravesen, P., **Beretning am Rögudvalgets undersägelser verdrörende problemet "ilde lugt."** [Report on the Smoke Committee's investigations of the problem of foul odor.] *Akademiet for de Tekniske Videnskaber, Copenhagen, Report*, No. **15, 1952.** 41 p. numerous graphs and tables. **DLC**—A committee was established in 1944 to investigate 1602 complaints from various communities and regions in regard to air pollution (smoke, soot, dust, smell, etc.) resulting from increased industrialization. Results are classified for two six-year periods (1935–40 and 1940–45) in order to distinguish between the type of heating used before and during the war. Some results of preventive means and precautions are included. The detailed data from 135 selected cases are applicable to corresponding cases. *Subject Headings:* **1. Atmospheric pollution 2. Smoke prevention.**—*W.N.*

6.3–96 551.510.42

*Clayton, George D.; Giever, Paul M. and Baynton, Harold W. (*All of International Joint Commission*), **Report of results of sampling the atmosphere in the Detroit River area during 1952.** International Joint Commission. Technical Advisory Board on Air Pollution. United States Section, Jan. 1, **1954.** 156 p. 42 figs., 25 tables, 11 refs. **DWB**—In addition to extensive tables, graphs and analysis of sampling data, the results of detailed analysis of weather conditions during the period Aug. 7 to Sept. 18, 1952 in connection with particulate pollution data for the same period are presented. Synoptic charts as well as local hourly observations at Detroit Airport and radiosondes at Selfridge Field are considered. A composite chart showing the pressure distribution during the 10 days with highest pollution (High Center at Philadelphia) and the 9 days with least pollution (High Center over Iowa) are presented. Cold frontal passages reduce pollution as do high wind speeds and instability, or high temperature. *Subject Headings:* **1. Atmospheric pollution 2. Air sampling and analysis data 3. Detroit, Mich. I. International Joint Commission. Technical Advisory Board on Air Pollution. U. S. Section.**—*M.R.*

UPPER ATMOSPHERE—IONOSPHERE

6.3–97 551.510.52/3

Canada. Meteorological Div., **Determination of the tropopause.** Its *CIR*-2470, RAD 62, April 20, **1954.** 3 p. table (fold). Mimeo. **DWB**—The tropopause is defined and illustrations given to enable the observer to objectively locate the one or more tropopauses on a given radio sounding. A form is provided for tabulating the height, pressure and temperature of these tropopauses. The form is to be used on an experimental basis at Canadian stations for one year, ending March 1955. *Subject Headings:* **1. Tropopause 2. Tropopause data tabulation 3. Canada.**—*M.R.*

6.3–98 551.510.52/3

Endlich, Roy M., **A note on pressure at the tropopause.** *American Meteorological Society, Bulletin*, 35(3):131–132, March **1954.** fig., 3 refs. **MH-BH**—Using teletype radiosonde reports for Nov. 1952 to March 1953, the frequency of tropopauses (according to standard Air Weather Service definition) at various heights from 80 mb to 320 mb are tabulated in graphical form. It is evident that there is a strong preference for the standard pressure levels (100, 150, 200 and 300 mb) at the expense of nearby heights out of all proportion to statistical probability. The bias is evidently due to coding instructions which enables the observer to omit temperature variations or changes in lapse rate which might produce significant variations in height of tropopause above or below the standard levels. *Subject Headings:* **1. Tropopause height frequencies 2. Radiosonde data 3. Tropopause coding.**—*M.R.*

6.3–99 551.510.534:551.521.31

Goody, R. M. and Walshaw, C. D., **An investigation of the 9.6μ band of ozone in the telluric spectrum.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 27–30. 3 figs., 3 refs.) **DWB**—Solar spectrum in 9.6μ region recorded at Cambridge, Eng., in 1952, which depends on pressure distribution of ozone, and total ozone measurements at Oxford, gave a mean height of ozone layer of 18 km with a minimum of 15 km in early Aug. *Subject Heading:* **1. Ozone distribution.**—*C.E.P.B.*

6.3–100 551.510.534

Normand, Sir Charles, **Ozone and the upper atmosphere.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 4–8, 8 refs.) **DWB**—Introductory talk to discussion on "Ozone and the high atmosphere." Evidence of atmospheric structure and ozone layer variations is summarized and causes of ozone changes discussed and recent improvements in technique referred to. *Subject Heading:* **1. Ozone layer.**—*C.E.P.B.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Precip. & vorticity** (Wolff, Dickson), 6.3–82; **Momentum transfer** (Bjerknes), 6.3–111 and (Sheppard), 6.3–112; **Turbulent momentum transfer** (Deacon), 6.3–155; **Momentum transfer theory** (Karush), 6.3–163; **Eddy transfer of heat** (Jehn, Gerhardt), 6.3–164; **Soil erosion by snow melt** (Yakuwa), 6.3–284.

6.3–101 551.511:551.515.827

Austin, J. M., **The forecasting significance of the Reed-Sanders article.** *Journal of Meteorology*, 11(3):253–254, June **1954.** 2 figs., 7 refs. **MH-BH**—The analysis of the synoptic development of Jan. 28, 1953, by R. J. Reed and F. Sanders (*see item* 5.3–138, March 1954, *MAB*) is found to be important in development of many upper wave trough patterns. *Subject Headings:* **1. Frontal development 2. Upper level troughs.**—*C.E.P.B.*

6.3–102 551.511:551.521.32:533.15

Bouvier, Pierre B., **Les équations intégrales de Milne pour une atmosphère parfaitement diffusante.** [Milne's integral equations for a completely diffusive atmosphere.] *Geneva. Observatoire, Publications, Ser. A, Astronomie, Chronometrie, Geophysique*, No. 48 (i.e., Vol. 5,

No. 14), 1953. refs., eqs. **DWB.** Reprint from *Archives des Sciences*, Geneva, 6(5):239–245, 1953. **DLC**—In the case of a diffusive stellar atmosphere of unit albedo (conservative case) the diffuse radiation at a given point of angle Θ will be subject to a law involving a function of phase p (cos Θ). The effect of this function on MILNE's integral equations (especially is $p=1+\cos^2\Theta$) is analyzed in this paper. *Subject Headings:* **1. Atmospheric diffusion 2. Diffuse radiation 3. Integral equations.**—*From author's abstract.*

6.3–103 551.511:551.513

Kao, Shih-Kung, **Harmonic wave solutions of the non-linear vorticity equation for a rotating viscous fluid.** *Journal of Meteorology*, 11(5):373–379, Oct. 1954. fig., 11 refs., 50 eqs. **DWB**—With the assumption of non-divergent horizontal flow, harmonic wave solutions of the non-linear hydrodynamic equations for a rotating, viscous fluid are obtained both for the plane and for the sphere. These solutions yield waves which may be damped, amplified, or remain unchanged, depending on the longitudinal and latitudinal extents of the waves, and also on the vertical profile of the stream function. For plane flow, the vertical profile of the velocity components is shown to be a sinusoidal function, or a hyperbolic sine and cosine of z, proportional to or independent of z, the elevation. For spherical flow, the vertical profile is shown to be proportional to a Bessel function of order $n+\frac{1}{2}$, and n, an integer, is the degree of a surface spherical harmonic. Harmonic waves are amplified, neutral or damped, depending respectively on whether the argument of the Bessel function is imaginary, zero or real. No steady wave is possible in spherical viscous flow, although quasi-stationary waves, which may be defined as waves with zero wave-velocity but changing wave-amplitude, may occur under certain circumstances. *Subject Headings:* **1. Vorticity equations 2. Zonal circulation.**—*Author's abstract.*

6.3–104 551.511:551.515

Kuo, H.-L., **Symmetrical disturbances in a thin layer of fluid subject to a horizontal temperature gradient and rotation.** *Journal of Meteorology*, 11(5):399–411, Oct. 1954. 7 figs., table, 11 refs., 56 eqs. **DWB**—It is shown "that a finite horizontal temperature contrast is required to produce a symmetric convective motion in a stably stratified rotating fluid. This necessary minimum temperature contrast increases with the rate of rotation and with the static stability, and also increases with the horizontal scale of the motion. When applied to the motions in the atmosphere, this study shows that very large meridional cells cannot exist under the normal temperature distribution, especially in middle and higher latitudes. However, such convective motions of a relatively smaller scale can be produced by a horizontal temperature contrast, for example, along the strong jet streams of westerlies in the upper atmosphere. The applicability of the theory to the land-and-sea breezes and also to certain features of the monsoon circulation is apparent. Certain smaller-scale convective processes that cannot be explained by vertical instability may also find their explanation in the effect of the horizontal temperature contrast." *Subject Headings:* **1. Convection 2. Stationary perturbations.**—*From author's abstract.*

6.3–105 551.511:551.551:551.510.42

Lowry, P. H. (*Brookhaven National Lab., Upton, N. Y.*), **Eddy diffusion from elevated sources. The Brookhaven experience.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 19:447–456, Dec. 1952. 5 figs., 4 refs. **DWB**—Diffusion of oil-fog from an elevated source was studied under unstable, neutral and inversion conditions. Parameters are compared for the distance at which the oil-fog first reaches the ground and the maximum instantaneous peak concentration as a function of distance. A satisfactory agreement with the elevated source equation of SUTTON was found. It has to be considered that the vertical wind velocity distribution may be asymmetric. Under inversion conditions the plume does not diffuse appreciably in excess of 20 miles from the source. *Subject Headings:* **1. Horizontal diffusion 2. Smoke stacks 3. Oil fog.**—*A.A.*

6.3–106 551.511:551.555.1

Riehl, Herbert, **Variations of energy exchange between sea and air in the trades.** *Weather*, 9(11):335–340, Nov. **1954.** 3 figs., 5 refs. **DWB**—Heat is transferred from sea surface to cooler air by eddies (diameter hundreds of yards). Example of fluctuating wet and dry bulb shown and compared with smooth traces when sea is colder than air. Process of heat transfer is discussed; stability and wind are important. Evaporation rate may double discontinuously when wind speed rises above 13–15 kt. Broad-scale wind fluctuations are shown by cycles of zonal index (35–65°N) associated with fluctuations of trades. Further data required. *Subject Headings:* **1. Energy exchange 2. Trade winds.**—*C.E.P.B.*

GENERAL CIRCULATION

See also: **Planetary atmos. circulation** (White), 6.3–94; **Zonal circulation** (Kao), 6.3–103; **General circulation** (Eady), 6.3–156.

6.3–107 551.513:551.501.7

Berry, F. A.; Haggard, W. H. and Wolff, P. M., **On the analysis of 500-millibar zonal wind profiles and index cycles.** *Journal of Meteorology*, 11(5):380–386, Oct. **1954.** 7 figs., 5 tables, 5 refs. **DWB**—Smoothed daily values of geostrophic west winds at 500 mb by 5° zones 10–70°N, 1945–52, were analyzed. Annual variation isopleths are shown for hemisphere and each quadrant. Annual variation of average speed and range is plotted. Data showed strong continuity from day to day and often from one half-month to another. A specimen of analysis is shown. *Subject Heading:* **1. Zonal index.**—*C.E.P.B.*

6.3–108 551.513:551.553.21:551.555.1

Flohn, Hermann, **Trade-wind and monsoon circulation according to aerological observations.** *International Geographical Congress, 17th, Washington, Aug. 8–15*, **1952,** *Proceedings.* pub. (1952?). p. 24–27, 2 figs., 13 refs. **DLC**—On the basis of recent accumulated observations, the author doubts some classical aspects in the concept of the general circulation. The trade winds are not a thermal circulation, since easterlies are observed above the trade wind inversion. The equatorial westerlies are assumed as a part of the planetary circulation, as well as the so-called monsoon, which are explained by a planetary seasonal shifting of the intertropical convergence zone. *Subject Headings:* **1. General circulation 2. Trade winds 3. Monsoons.**—*A.A.*

6.3–109 551.513:551.557

McIntyre, D. P. and Lee, R., **Jet streams in middle and high latitudes.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 172–181. 6 figs., 15 refs.) **DWB**—A composite section showing wind field 13–67,000 ft over N. America in relation to 500 mb temperature in Jan. 1953 and isopleths of jet stream frequency show a major jet stream at 32,000 ft, directly above isotherm of −22°C; 3 other cores were found. Jet streams tended to be associated with Continental Arctic front, Maritime Arctic front and Polar front. Tropical and stratospheric jets were also found. Jet streams tend to move towards higher troposphere temperatures, usually with a slight downward component. *Subject Heading:* **1. Jet stream.**—*C.E.P.B.*

6.3–110 551.513:551.557

Palmer, C. E., **The general circulation between 200 mb and 10 mb over the equatorial Pacific.** *Weather*, 9(11):341–349, Nov. **1954.** 3 figs., 19 refs. **DWB**—"Krakatoa winds" at 30–25 km and recent nuclear tests have shown an easterly current averaging 30 m/s in 15°N–15°S, from 21–27 km up to at least 40 km, underlain near 2°N by equatorial stratospheric ("von Berson") westerlies. A meridional section along 180° shows these, temperatures, tropopauses and jet streams on Jan. 30, 1954. Distribution is explained by A. H. R. Goldie's model (1950) of meridional circulation, taking account of temperature and photochemical changes of oxygen, and expanding it to include zonal circulations. Results are shown sche-

matically as a section for 10–60 km in 20°S–25°N through central Pacific, showing direct and indirect cells. *Subject Headings:* **1. General circulation 2. Krakatoa winds 3. Von Berson winds 4. Pacific Ocean.**—*C.E.P.B.*

6.3–111 551.513.1:551.511

Bjerknes, J., **The flux of angular momentum and heat in the general circulation. Extended summary.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 122–123.) **DWB**—The supply of angular momentum to a zonal ring is discussed and the results of a U. S. Air Force project at Los Angeles summarized. Correlation between convergence or divergence of geostrophic meridional transfer and observed variations decreases equatorward. Extension of "Hadley circulation" N of 30°N accumulates angular momentum and extension of "Ferrel circulation" southward depletes it; these decide rises and falls of zonal index. Comment by H. Flohn p. 131–132. *Subject Headings:* **1. General circulation 2. Momentum transfer. I. Flohn, H.**—*C.E.P.B.*

6.3–112 551.513.1:551.511

Sheppard, P. A., **Momentum flux and meridional motion in the general circulation.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 103–108. fig., 11 refs., 4 eqs.) **DWB**—Introductory address to Symposium on the general circulation. The equation of zonal momentum is set out, emphasizing the importance of meridional and vertical transfer. The upper westerlies in the zone of surface westerlies require a downward flux of zonal momentum throughout the troposphere below level of maximum wind, and probably an upward flux above this level but the source of the flux is not yet clear. In the zone of surface easterlies it is attributed to meridional mean motion. *Subject Headings:* **1. General circulation 2. Momentum transfer.**—*C.E.P.B.*

6.3–113 551.513.1

*White, Robert M., **The horizontal eddy flux of energy across 31°N.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 24:79–83, Nov. **1953.** 2 tables, 10 refs., 5 eqs. Also issued as its *AFCRC Technical Report*, 53–35. **DWB, DLC**—Previous attempts by the author (R. Met. Soc., Q. J., 1951) to define large scale energy transport across latitudes were based on data limited vertically and longitudinally. The present paper gives computations made for one year all around the hemisphere near 30°N (using 19 stations or alternates). Wind, temperature and specific humidity data for 1000, 850, 700, 500, 300, 200 and 100 mb were used as found in U. S. Weather Bureau Daily Synoptic Weather Map Series for Jan. 1–Dec. 31, 1950, for 0300 GMT, and the poleward flux of eastward angular momentum, heat and moisture calculated for the entire atmosphere. Results show that poleward flux of enthalpy and latent energy = 2.5 and 2.9×10^{14} cal/sec, respectively, compared with 6 or 7 or 9×10^{16} deduced from radiation calculations by London (1951), Baur and Phillips (1935) and Gabites (1951), respectively, and from evaporation and precipitation as 3.6×10^{14} by Conrad (1936). Thus flux due to horizontal eddy flux approximates that required to satisfy radiation or latent heat balance. *Subject Headings:* **1. Meridional heat flux 2. Energy transport.**—*M.R.*

6.3–114 551.513.2:551.515

Gilchrist, B., **The seasonal phase changes of thermally produced perturbations in the westerlies.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 129–131. 3 figs., 3 refs.) **DWB**—Sections round a circle of latitude in westerlies show a reversal of vertical slopes of troughs and ridges between summer and winter. This is attributed to a change in the division of wave-length space by quasi-resonant frequencies. *Subject Heading:* **1. Waves in the westerlies.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

See also: **Tornadoes of U. S.** (Flora), 6.3–2; **Elements rage** (Lane), 6.3–6; **Thunderstorm distribution** (World Met. Org.), 6.3–10; **Tornado analysis** (Huff, others), 6.3–36; **Radar scope photography** (Hunter), 6.3–38; **Upper level troughs** (Austin), 6.3-101; **Stationary perturbations** (Kuo), 6.3–104; **Waves in the westerlies** (Gilchrist), 6.3–114; **Hurricane & turbulence recorders** (Schloemer), 6.3–159; **Jet stream** (Teweles), 6.3–190; **Line squall cloud,** 6.3–248; **Squall clouds** (McDowall), 6.3–249; **Disturbance of electric field in atmos.** (Uchikawa), 6.3–361.

6.3–115 551.515.1:551.515.7

Sutcliffe, R. C., **Cyclones and anticyclones; a comparative study.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 139–143. ref.) **DWB**—Difficulties in the explanation of the middle latitude cyclonic belt by dynamical instability of baroclinic currents are set down and methods of approach (perturbation, development theory, dynamical theory) referred to. Similarities and differences between theory of cyclones and anticyclones are discussed; and from land and sea contrasts in winter, it is suggested that the thermal effect predominates. In the Northern Hemisphere the stable long-wave pattern may change to slow-moving large scale systems in which blocking anticyclones may build up; this is rare in the Southern Hemisphere. *Subject Headings:* **1. Cyclones 2. Anticyclones.**—*C.E.P.B.*

6.3–116 551.515.11

Bjerknes, J., **The problem of cyclogenesis from Helmholtz's time to the present.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 133–138. 4 figs., 3 refs., 7 eqs.) **DWB**—The Helmholtz principle of dynamic instability is stated with reference to a sloping isentropic surface. "An upslope impulse imparted to the saturated air on a quasi-stationary front can be considered as the most likely initiation of frontal cyclogenesis." Change from parallel to confluent westerlies increases chance of frontal cyclogenesis. An equation (7) is set out as a guide to probable location and intensity and an example (Jan. 16–17, 1949) shown. The role of difluent upper troughs in providing the necessary divergence for deepening cyclones is important; they are attributed to cyclonic shear north of the jet stream. *Subject Heading:* **1. Cyclogenesis.**—*C.E.P.B.*

6.3–117 551.515.11:551.509.317:681.14

Sawyer, J. S., **Some aspects of mobile depressions in a baroclinic current studied by means of the two-parameter representation of the atmosphere.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 145–153. 7 figs., 7 refs., 10 eqs.) **DWB**—The two-parameter model is applied to a small mobile depression in a baroclinic current (England 14–15 March 1949) with good results. The 3-dimensional trajectories in an ideal depression are computed. It is concluded that the two-parameter model is satisfactory. The circulation includes air moving with the disturbance, air at low levels entering from ahead and leaving by the rear, and high level air entering from the rear and passing out ahead. The boundaries between these resemble fronts. *Subject Headings:* **1. Cyclone dynamics 2. Upper air analysis 3. Numerical forecasting.**—*C.E.P.B.*

6.3–118 551.515.127

Miles, M. K., **Influence of a quasi-stationary long-wave pattern on small-scale thermal features.** *Meteorological Magazine,* London, 83(989):338–341, Nov. 1954. 4 figs. **DWB**—During an almost stationary long-wave pattern Feb. 25–March 9, 1953, 4 small cold troughs moving E across Atlantic were tracked by movements of 17,400 ft thickness line (1000–500 mb). All followed mean total thickness pattern and moved $>30°$ long./day. On March 5–6 and 8–9 movement exceeded that calculated from advection; difference is attributed to dynamical warming in SW part of trough. *Subject Heading:* **1. Upper level troughs.**—*C.E.P.B.*

6.3–119 551.515.81

§Miles, M. K., **A kata-front of notable structure.** *Meteorological Magazine*, London, 83(988):289–293, Oct. **1954.** 6 figs., 2 refs. **DWB**—Structure of a front over England on July 6, 1953, is shown by surface and 300 mb charts and vertical sections. At 800 mb level cold moist air behind the cold front was overrun by warm very dry air (R.H. below 10%). The marked overrunning is attributed to the advance of an intensifying upper trough. *Subject Heading:* **1. Frontal structure.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Radiation theory** (Heitler), 6.3–5; **Met. obs.** (Gold, others), 6.3–50; **Radiation error of radiosonde** (Grober), 6.3–67; **Atmos. poll. effects** (Hewson), 6.3–88; **Ozone distribution** (Goody, Walshaw), 6.3–99; **Atmos. diffusion** (Bonvier), 6.3–102; **Trade wind & zonal circulation** (Flohn), 6.3–108; **Radiation scattering method** (Baxter), 6.3–227; **Climatic classifications** (Gorczyński), 6.3–317; **Nitrogen afterglow** (Oldenberg), 6.3–359

6.3–120 551.521:551.578.46

Gerdel, R. W.; Diamond, M. and Walsh, K. J., **Nomographs for compilation of radiation heat supply.** *U. S. Snow, Ice and Permafrost Research Establishment, Research Paper*, No. 8, Feb. **1954.** 6 p. 2 tables, 3 graphs, 7 refs. **DLC**—Nomographs are given for daily total solar radiation, depending on: a) time of year and latitude (40–90°N), corrected for sky conditions and elevation; b) albedo of snow versus age of snow for temperatures above and below freezing; c) solar radiation absorbed by snow cover; d) radiational heat balance and equivalent melt, considering sky conditions; e) solar radiation available at a certain depth below the snow surface for snow of a given density versus solar radiation absorbed by the snow surface. The technical background for these graphs is explained in a concise way. *Subject Headings:* **1. Solar radiation 2. Radiation balance 3. Heat balance of snow.**—*A.A.*

6.3–121 551.521

Hand, I. F., **Methods of calculating solar radiation values at Blue Hill Observatory, Milton, Massachusetts.** *Monthly Weather Review*, 82(2):43–47, Feb. **1954.** 2 figs., table, 10 refs., 6 eqs. **DWB**—Methods are presented for calculating the direct solar radiation at normal incidence (I_{nm}), and total sun and sky radiation on a horizontal surface I_{hm}. Accuracies of $<\pm 2.5\%$ may be attained by this formula, using Eppley pyrheliometer data obtained at Blue Hill Observatory from Jan. 1950 through April 1952 and normal incidence data obtained from an eye silver-disk pyrheliometer. Scatter diagrams show the dispersion of points from the fitted curves on which the formula are based. Data for each day, for all of the required parameters are given *in-extenso* in tables. Calculations can be made for 80 stations in the U. S., Canada and Alaska. *Subject Headings:* **1. Radiation calculations 2. Radiation data 3. Blue Hill Observatory.**—*M.R.*

6.3–122 551.521:551.524.4:551.554:551.578.46(211.2)

Liljequist, G. H., **Radiation and wind and temperature profiles over an Antarctic snowfield—a preliminary note.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 78–87. 7 figs.) **DWB**—Observations at Maudheim are summarized including direct solar radiation, total (sun+sky, clear or overcast), albedo of snow, extinction of red, orange, light blue and blue light in snow, effective outgoing radiation, temperature and wind profiles 0–10 m above snow (neutral and stable stratification). A wind profile constant $k = u_1/u_{10}$ is defined, where u_i is the departure from logarithmic profile, and related to the stability $S = (g\theta)/(\partial\theta/\partial z)$ by $k = \exp(-0.093\ S^{0.63})$. Radiation-balance values are small both in summer (high albedo) and winter (inversion conditions). *Subject Headings:* **1. Radiation balance 2. Ver-**

ical temperature gradient 3. Wind profiles 4. Snow cover influences 5. Antarctica.—*C.E.P.B.*

6.3–123 551.521.1

Georgii, Walter, **Mediciones de la intensidad de la radiación solar en la Argentina.** Solar radiation intensity measurement in Argentina.] *Mendoza, Argentina. Universidad Nacional de Cuyo. Departamento de Investigaciones Científicas, Anales,* 1(2):55–107, **1953.** 9 figs., 17 tables, 12 refs. Spanish and German summaries p. 55–56. **DWB**—Measurements f the intensity of solar radiation obtained at the observatories of "Altura Peron" (3840 m) nd "Eva Peron" (3100 m) and in airplane flights (6.5 km above central and northern Ar-entina) were made during the summer 1952 and 1953. The values of total intensity and of he various spectral intensities $\lambda<644$ mμ, $\lambda<509$ mμ, 644 m$\mu>\lambda>509$ and of $\lambda>644$ mμ t the two observatories and during the airplane flights are given and analyzed. The in-ensity of radiation, the coefficients of extinction of dry air, the factors of opacity and ab-orption for water vapor and of extinction for dust and the daily variation of the meteorological ariables are discussed. *Subject Headings:* **1. Solar radiation intensity measurements 2. Air-lane observations 3. Argentina.**—*I.L.D.*

6.3–124 551.521.14:551.508.21

Wörmer, Heinrich, **Die Schwächung der Sonnen- und Himmelsstrahlung beim Durch-ang durch ebene und halbkugelförmige Glasflächen.** [The weakening of the solar and sky adiation at the transition through flat and hemispherical surfaces.] *Zeitschrift fur Meteor-logie,* 7(10):289–298, Oct. **1953.** 7 figs., 7 tables, 5 refs. **MH-BH**—The effect of plane and emispherical glass covers on the results of radiation measurements is determined by the eflection from the surface of the glass and hence depends on the height of the sun. Detailed quations for characteristic cases are derived computing the results by numerical integration. Not in a single case is measurement without distortion possible. The hemispherical cover ould give fair results for the direct solar radiation if there were no distortion by catacaustical ffects (reflection from the interior surface). The diameter of the sensitive element has to be naller than half of the hemispherical cover in order to avoid the most obvious errors, which re especially great at zenith distances of the sun over 70°. *Subject Headings:* **1. Radiation easurement 2. Solar radiation 3. Sky radiation 4. Instrument optics.**—*A.A.*

6.3–125 551.521.3

Kaplan, Lewis D., **A quasi-statistical approach to the calculation of atmospheric trans-ission.** (In: American Meteorological Society and Royal Meteorological Society, **Proceed-ngs of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 43–48. g., 13 refs., 9 eqs.) **DWB**—The infrared absorption spectra of atmospheric gases, e.g., CO_2, re too complex for direct calculation of radiative flux. In any sub-band line-intensities, emperature dependence spacing and half-widths can be represented by generalized con-nuous functions; and by making the justified assumption that the lines in any sub-band re randomly distributed, generalized transmissions can be calculated from transmissions at egular discrete frequencies. Application to water vapor is discussed. *Subject Heading:* **Transmission coefficients.**—*C.E.P.B.*

6.3–126 551.521.31

Godson, W. L., **Spectral models and the properties of transmission functions.** (In: merican Meteorological Society and Royal Meteorological Society, **Proceedings of the oronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 35–42. 7 figs., 7 refs.,) eqs.) **DWB**—For integration of terrestrial radiative fluxes the actual assembly of lines ust be replaced by an idealized spectral model. ELSASSER's regular and GOODY's random odel are compared and a random transmission function for water vapor derived. Pressure ffects are examined; as transmission decreases a linear correction to absorbing mass is ap-roached more rapidly for the random than the regular model. The usefulness of a slab ffusivity factor is investigated for the evaluation of flux transmission. *Subject Heading:* **Radiation calculations.**—*From author's abstract.*

6.3–127 551.521.4:551.593.55

Barber, D. R., **Note on the seasonal variation of sodium D-line emission in twilight.** *Journal of Atmospheric and Terrestrial Physics*, 5(5–6):347–348, Nov. **1954.** table, 6 refs. **DWB**—Seasonal variation of unpolarized *D*-line radiation (around 5893Å) in twilight in effective height range 30–65 km (solar depression 3.8–7°) is tabulated and discussed. *Subject Headings:* **1. Twilight luminescence 2. Sodium emission.**—*C.E.P.B.*

6.3–128 551.521.4

Bates, D. R. and Dalgarno, A., **Theoretical considerations regarding the dayglow.** *Journal of Atmospheric and Terrestrial Physics*, 5(5–6):329–344, Nov. **1954.** fig., 49 refs. 50 eqs. **DWB**—Records of photometers on rockets show intensity of dayglow as constant from 40 to at least 135 km. Photon intensity of incident solar radiation 7000–910Å shows that an emissive source of such great altitude and intensity cannot be reconciled with direct solar photo-action. Various possibilities of emission by processes known to be operative are discussed and altitude for 1% transmission of solar radiation is plotted against wavelength. An appendix gives basic formulas for resonant and fluorescent scattering by the earth's atmosphere. *Subject Heading:* **1. Dayglow.**—*C.E.P.B.*

6.3–129 551.521.61:551.521.32

London, Julius, **The distribution of infra-red cooling in the atmosphere for winter and summer seasons.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 60–68. 7 figs., 18 refs. Brewer, A. W., **Discussion,** *Ibid.*, p. 68.) **DWB**—Sections (0–90°N) were constructed showing mean distributions of temperature, water vapor and cloud in winter and summer. From these vertical and latitude distributions of infrared radiation flux and flux divergence were calculated for clear and cloudy skies for each 5° zone of latitude. Results with average cloudiness, winter and summer, are illustrated. They show general infrared cooling, reaching a maximum of 2½–3°C per day at a height of 2 km in Arctic rising to 6 km in 15°N in summer and 4 km at equator in winter. There is a secondary maximum at 8–12 km near equator. In the discussion A. W. Brewer compared downward radiation, 0.7–40μ obtained with an aircraft up to 40,000 ft over England with calculated values, showing good agreement. *Subject Headings:* **1. Infrared radiation 2. Atmospheric radiation.**—*C.E.P.B.*

6.3–130 551.521.6

Plass, Gilbert N., **Some problems in atmospheric radiation.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 53–59. 3 figs., table, 13 refs., 6 eqs.) **DWB**—The laboratory absorption data of CO_2 (W. H. Cloud, 1952) 12–18μ and a fitted absorption curve are discussed, and the correction for effective temperature of atmospheric layers computed. A similar analysis is made for the 9.6μ band of ozone. Radiation flux from ground in these bands is calculated. Approximations in the theoretical calculation of atmospheric transmission functions are examined and simple forms for single lines and the Elsasser band model set out. Its application to the calculation of infrared radiation flux from water vapor and ozone (varying with height and temperature) is illustrated. *Subject Heading:* **1. Infrared absorption spectrum.**—*C.E.P.B.*

6.3–131 551.521.61:551.510.53

Walshaw, C. D. and Goody, R. M., **Absorption by the 9.6μ band of ozone.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 49–52. 3 figs., 7 refs., 2 eqs.) **DWB**—Intensity of absorption was measured for ozone amounts up to 1.5 cm STP and pressures ½–760 mm. The failure to fit a single curve to the observations is attributed to the assumption of an infinite homogeneous array of absorption lines, and an empirical correction factor defined which gives a sufficiently good fit for purposes of calculation. *Subject Heading:* **1. Infrared absorption 2. Ozone absorption.**—*C.E.P.B.*

TEMPERATURE

See also: **Temperature normals** (Lenhard, others), 6.3–35; **Rocket obs.** (Johnson), 6.3–53; **Upper air temps.** (Scrase), 6.3–69; **Advection** (Holzworth, Thomas), 6.3–77; **Upper air temp. forecasting** (Eldridge), 6.3–80; **Radiation wind & temp. profiles** (Liljequist), 6.3–122; **Atmos. temp.** (Arnold, Brasefield), 6.3–140; **Atmos. winds & temps.** (Crary, others), 6.3–141; **Pressure & temp. variations** (Chiplonkar), 6.3–152; **Atmos. winds & temps.** (Kennedy, others), 6.3–186; **Diurnal atmos. winds & temp. variations** (Kennedy, others), 6.3–187; **Vertical water vapor distrib.** (Saha), 6.3–211; **Animal ecology** (Wildhagen), 6.3–331.

6.3–132 551.524.1:551.588.7

Duckworth, Fowler S. and Sandberg, James S. (*Stanford Univ., Stanford, Calif.*), **The effect of cities upon horizontal and vertical temperature gradients.** *American Meteorological Society, Bulletin*, 35(5):198–207, May **1954.** 8 figs., table, 9 refs. **MH-BH**—For three California cities of various sizes, two-meter-level temperature patterns were determined by intensive traverses with automobile-mounted thermistors, and vertical temperature gradients in the lowest 1000 ft were measured by wiresonde simultaneously at urban centers and peripheral open areas. In 35 evening surveys under varying weather conditions, a characteristic horizontal temperature pattern existed for each city. Temperatures increased from peripheral open lands to built-up center in direct proportion to structure density. Characteristics of the urban gradients have been analyzed in relation to city size and to meteorological parameters. Vertical temperature data showed that built-up areas frequently caused instability up to about 3 times roof height in otherwise stable air and that a "crossover" point sometimes existed above which the air over the urban center was cooler than that over surrounding country. A review of this article under the title "Cities 20 degrees hotter; temperature difference of 20 degrees Fahrenheit found in San Francisco between city center and undeveloped land in Golden Gate Park" appeared in Science News Letter. *Subject Headings:* **1. Urban influences 2. Temperature gradient 3. Temperature profiles 4. California.**—*Authors' abstract.*

6.3–133 551.524.2(73/9) 551.571.2(73/9)

*Day, W. P., **Comparative local noon temperature and humidity data for the United States.** *Monthly Weather Review*, 81(10):332–335, Oct. **1953.** 6 figs., table, 5 refs. **DWB**—Average values of local noon temperature and relative humidity in Jan., April, July and Oct. at some 80 stations throughout the U. S. are tabulated for the 21-year period 1918–1938. The values for Jan. and April are also graphically represented. *Subject Headings:* **1. Temperature normals 2. Humidity normals 3. United States.**—*G.T.*

6.3–134 551.524.2:551.581

Schumann, T. E. W., **The global distribution of average atmospheric temperature.** *South Africa. Weather Bureau, Notos*, 3(1):4–11, **1954.** 8 figs., 9 tables, 4 refs., 20 eqs. **DWB**—The meridional distribution of surface temperature and its seasonal variation is computed as the solution of a basic differential equation involving the heat capacity of an idealized fluid surface layer of uniform temperature, time, thermal conductivity, in- and outgoing radiation. Fourier series were introduced for the distribution of the radiation terms, in order to facilitate the integration. The agreement with the observed temperature distribution is quite satisfactory with the exception of the North Pole. *Subject Headings:* **1. Meridional profiles 2. Temperature distribution 3. Heat exchange.**—*A.A.*

6.3–135 551.524.31:551.506.3(899) 551.571.31:551.506.3(899)

*Chiazzaro, Leandro and Gonzáles, Juan, **Normales horarias de la temperatura y humedad atmosférica.** [Hourly normals of temperature and atmospheric humidity.] *Revista Meteorológica*, Montevideo, 12(44/45):97–99, June/Dec. **1953.** 2 tables. **MH-BH**—Hourly normals of temperature (periods 1901–24 and 1930–1952) and of relative humidity (1906–1924 and 1931–1952) are tabulated for Montevideo for each month of the year. *Subject Headings:* **1. Diurnal temperature variations 2. Diurnal humidity variations 3. Montevideo, Uruguay.**—*G.T.*

6.3–136 551.524.31(421) 551.571.31(421)

Davis, N. E., **Surface temperature and vapour pressure at London airport.** *Meteorological Magazine,* London, 83(988):297–302, Oct. 1954. 3 figs. **DWB**—For London Airport curves of mean hourly temperature and S.D. of hourly values, 1947–51, are given for Jan., April, July, Oct. April and July show maximum S.D. in afternoon, Jan. a minimum. Differences are associated with diurnal variation of cloud or fog, wind and insolation in maritime and continental air. Vapor pressure shows little diurnal variation with minimum at sunrise and maxima in mid-morning (evaporation of dew) and late afternoon (convection dying down). *Subject Headings:* **1. Diurnal temperature variations 2. Diurnal humidity variations 3. London, England.**—*C.E.P.B.*

6.3–137 551.524.34(71)

Longley, Richmond W., **Temperature trends in Canada.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 207–211. 2 figs., table, 5 refs.) **DWB**—Ten-year running means of annual temperature since 1880 are presented for 14 stations in Canada, all showing warming since 1880 with minor fluctuations of different extent. *Subject Headings:* **1. Temperature trends 2. Canada.**—*C.E.P.B.*

6.3–138 551.524.34:551.583

Manley, Gordon, **Climatic change: the problem of transatlantic correlation. Introductory survey by Chairman of Panel Discussion.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 199–206. 2 figs., 29 refs.) **DWB**—Temperature changes since 1700 in eastern N. America and western Europe are shown by accumulated summer temperatures near the tree-line, suggesting use of tree-ring series near tree-line. Decadal means show considerable agreement. Changes of Iceland glaciers and East Greenland drift ice suggest a maritime rather than continental cause and introduce a lag. Fluctuations of zonal index may explain minor but not major oscillations. *Subject Headings:* **1. Temperature trends 2. Climatic variations.**—*C.E.P.B.*

6.3–139 551.524.36(426)

Parry, M., **Local degree-day variations in the Reading area.** *Meteorological Magazine,* London, 83(988):307–309, Oct. 1954. fig., 2 tables, 2 refs. **DWB**—Degree-days below 60°F in 1951–52 at 10 stations around Reading are plotted and discussed. The annual increase is about 100 units per 90 ft height. *Subject Headings:* **1. Degree days 2. Reading, England.**—*C.E.P.B.*

UPPER AIR TEMPERATURE

6.3–140 551.524.7

Arnold, A. and Brasefield, C. J., **Atmospheric temperatures at 30 kilometres.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 14–16. 3 figs., 2 refs.) **DWB**—Daily temperatures at 30 km above Belmar, New Jersey, Nov. 17, 1952–Jan. 25, 1953 from balloon ascents showed a general level of −50 to −55°C with marked rises in early Dec. and early Jan. On Jan. 5 temperature rose to −46° and on Jan. 6 to −34°C, a rise >16°C in 2 days. This occurred simultaneously at all levels 15–35 km, maximum rise at 9 mb (31.5 km). There was a marked increase of geomagnetic index K_p on Jan. 5. *Subject Heading:* **1. Temperature of the stratosphere.**—*C.E.P.B.*

6.3–141 551.524.7:551.557:551.596.1

Crary, A. P.; Kennedy, William B. and Bushnell, Vivian C., **Atmospheric winds and temperatures at heights up to 60 kilometres as determined by acoustical propagation studies.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 9–13. 5 figs., table, 6 refs.) **DWB**—Results of measurements of temperature profiles up to 50 km, maximum wind speed and wind azimuth in Canal Zone, Florida, New Mexico, Bermuda, Colorado and

Alaska, from anomalous sound transmission of explosions, are presented in a table and charts and discussed. *Subject Headings:* **1. Temperature of the stratosphere 2. Winds in the stratosphere 3. Acoustical soundings.**—*C.E.P.B.*

SOIL TEMPERATURE

See also: **Sea temps.** (Koopmann), 6.3–176.

6.3–142 551.525

*†Findiklis, Theoklitos Th. (*Met. Service of Greece*), **Peri tēs Thermokrasias tou Edaphous En Helladi, Tomos I, Meros B, Thermokrasia Edaphous Athenōn.** [The temperature of the soil in Greece, v. 1, B, The temperature of the soil in Athens.] Athens, **1940.** 96 p. tables, bibliog. p. 55–73. Resumé in French, p. 89–96. **DWB**—*Subject Headings:* **1. Soil temperature 2. Athens, Greece 3. Greece.**

6.3–143 551.525.4:536.2

Carte, A. E., **Heat flow in the Transvaal and Orange Free State.** *Physical Society of London, Proceedings, Sec. B,* 67(9):664–672, Sept. 1, **1954.** 2 figs., 7 tables, 12 refs., eqs. **DWB**—Thermal conductivities of rocks and temperatures of 3 boreholes in S. Africa were measured to depths down to 6500 ft. Temperature gradients 2.77–4.33°C according to nature of rock. Heat flow is calculated as $(1.1 \pm 0.3)10^6$ cal cm^{-2} sec^{-1}. *Subject Headings:* **1. Underground temperatures 2. Thermal conductivity.**—*C.E.P.B.*

6.3–144 551.525.5

Nakaya, Ukichiro, **Method of analyzing geothermal data in permafrost.** *U. S. Snow, Ice and Permafrost Research Establishment, Research Paper,* No. 5, Aug. **1953.** 7 p. 3 figs., 2 tables, ref., eqs. **DWB**—Only precise measurements and adequate computation methods can show whether the permafrost in a certain region is growing or diminishing. NAKAYA criticizes the use of an empirical hyperbolic equation by G. R. MACCARTHY for the computation of the equilibrium temperature in a well. An experimental equation is suggested, and a short-cut method shown for computing the constants involved by subsequent approximations without applying the method of least squares. *Subject Headings:* **1. Permafrost temperatures. I. MacCarthy, G. R.**—*A.A.*

SEA TEMPERATURE

6.3–145 551.526.6

Bossolasco, Mario, **Il regime termico superficiale del mari Ligure e Tirreno: I.** [The surface temperature regime of the Ligurian and Tyrrhenian Seas. I.] *Geofisica Pura e Applicata,* 27:201–215, **1954.** 7 figs., 4 refs. Italian, German and English summaries p. 201. **MH-BH**—The average monthly and annual distribution of surface water temperature of the Ligurian and Tyrrhenian seas and adjacent water taken from measurements made by German merchant ships from 1906–14 and 1920–39 and the corresponding difference in air and sea temperature are analyzed with respect to effects of seasons and sea currents (coastal and return currents in the Corsica channel). Results are presented in the form of charts. *Subject Headings:* **1. Sea surface temperatures 2. Temperature differences sea-air 3. Sea current effects 4. Ligurian Sea 5. Tyrrhenian Sea 6. Mediterranean Sea.**—*M.R.*

6.3–146 551.526.6(263) 551.465

†Leipper, Dale F. (*Texas A. & M. Dept. of Oceanog.*), **Physical oceanography of the Gulf of Mexico: a brief review.** Texas. Agricultural and Mechanical College. Dept. of Oceanography, Contract N7onr-487, T.O.2, Project NR-083-036, Technical Report, No. 4, Feb. 1952. 20 p. 4 tables, 11 figs., bibliog. p. 19–20. **DWB**—A description of the currents in the Gulf of Mexico, and a brief account of investigations on ocean currents and summary of studies on sea surface temperatures at various locations in the Gulf of Mexico are given. The report contains tables giving monthly average sea surface temperatures in the Gulf of Mexico (from Atlas of Climatic Charts of the Oceans of U. S. Weather Bureau); variations of mean annual sea surface temperatures for 1912–1933 in various regions of the Gulf Stream; sea

surface temperature variations with depth in Gulf of Mexico proper (Panama); typical temperature and salinity data (Panama); a bibliography and charts showing ocean currents in Gulf (in June and Dec.), location of hydrographic stations in the Gulf, account of vessel "Alaska" (1950), location of other stations measuring sea surface temperatures and average sea surface temperature are included. *Subject Headings:* **1. Sea surface temperatures 2. Ocean currents 3. Gulf stream 4. Gulf of Mexico. I. Texas. Agricultural and Mechanical College. Dept. of Oceanography II. Contract N7onr-487,** T.O. 2.—*I.L.D.*

PRESSURE AND WIND

PRESSURE

See also: **Geostrophic winds** (Machta), **6.3–188.**

6.3–147 551.547

Berry, F. A.; Haggard, W. H. and Wolff, Paul M. (*Project AROWA, Naval Air Station Norfolk, Va.*), **500-millibar studies at Project AROWA.** *American Meteorological Society Bulletin*, 34(10):444–453, Dec. **1953.** 17 figs., 7 refs. **MH-BH**—In support of several related applied meteorological research tasks at Project AROWA, studies are being made of pressure patterns at the 500-mb level. Preliminary results of investigations based on data from the period 1946 through 1951 are presented. Examples of studies of the geostrophic wind profile, daily twenty-four-hour height-change charts, and tracks of the height-change centers are presented. A discussion of the preparation of composite charts for various types of blocking patterns is included. Some comments are made on the development of normal height charts and the Historical Map program. *Subject Headings:* **1. Pressure patterns 2. Project AROWA**—*Authors' abstract.*

6.3–148 551.547:550.38

Shapiro, Ralph, **A possible solar-weather effect.** *Journal of Meteorology*, 11(5):424–425, Oct. **1954.** 2 tables. **DWB**—Five-day sums of planetary geomagnetic index K_p are compared with persistence P of 5-day mean 500 mb heights (30–50°N, 60–130°W). A rapid rise of K is followed by P decreasing to a minimum 10–11 days after maximum K_p. *Subject Headings* **1. Magnetic disturbances 2. Upper air pressure.**—*C.E.P.B.*

6.3–149 551.547:551.509.5:519.241.

Tsutsui, Toshimasa and Tsuboi, Chuji, **On the correlation between the weather and the trends of upper isobars.** *Tokyo. Univ. Faculty of Science, Journal, Sec.* 1, 1(10):381–389, Dec. **1927.** 2 tables, fig. (fold.). **DWB**—Using a 5 point "isobar trends" scale (as indicative of air flow) for 3 km level as calculated from sea level pressure and mean temperature of column of air, and a 3 point "weather" scale (1 = rain or snow falling, 2 = cloudy and 3 = clear), correlation coefficients were worked out for each month and for a lag of 0, 6, 12, 18 and 24 hrs, respectively (based on data for Okayama on the Sea of Japan for Oct. 1924–July 1925). A "good" correlation was found for spring and autumn, indicating that trend of upper isobars would be a useful forecast aid at those seasons; but "loose" correlation in summer and winter. S. Fujiwhara suggests that better winter correlation might be found for Tokyo weather. *Subject Headings:* **1. Correlation coefficients 2. Air flow weather correlations 3. Upper level isobars 4. Objective forecasting aids 5. Japan.**—*M.R.*

6.3–150 551.547.1:629.1

*Lambach, R.; Mansfield, Robert M. and Bolton, E., **Aerologation: the principles of long range aerial navigation by aerology, and the science of measuring the necessary elements of aerology by altimetry.** Reading, Pa., TWA, International Division of Training Department, **1945.** Rev. June **1946** by Robert M. Mansfield. 32 p. 13 figs. Appended: Section 2, Rothenberg, Leon, **Notes on navigation by altimetry.** 5+p. graphs, tables, 9 refs. **DWB**—By combining pressure altimetry with radio altimetry it became possible to navigate over the oceans more successfully even in the absence of many weather reporting stations. This manual describes the principles and practice of minimum flight time navigation as it was

conceived in the early stages of the game. Theory and working tables, nomograms, correction scales and examples are included. *Subject Headings:* **1. Pressure pattern flying 2. Altimetry 3. Aerologation. I. Transcontinental and Western Air, Inc.**—*M.R.*

6.3–151 551.547.1:629.13

Mansfield, Robert M. (*TWA*), **Aerologation.** *Air-Sea Safety*, Wash., D. C., 2(4):39–47, April **1947.** 12 figs. **DWB**—The tested and proved principles and practices of aerologation (science of aerial navigation by altimetry) are outlined. Principle features of the system are the revision of the forecast upper-air chart during flight and the determination of drift by computation based on a drift formula derived by BELLAMY from the geostrophic wind equation. *Subject Headings:* **1. Aeronautical meteorology 2. Aerologation.**—*M.P.K.*

6.3–152 551.547.3:551.524.7(54)

*Chiplonkar, M. W., **Inter-diurnal variations of pressure and temperature in the upper atmosphere over North India.** *India. Meteorological Dept., Scientific Notes*, 9(109):81–92, **1946.** 5 figs., 9 tables. **DWB**—The paper contains an analysis of the day-to-day variability of upper air temperatures and pressures over Agra during the winter and early hot season months Nov. to April. The day-to-day differences of pressure and temperature are analyzed under three groups: 1) when the change of surface pressure is positive, 2) when it is within ±0.5 mb and 3) when it is negative. The day-to-day differences at different levels are averaged (1) taking the signs of the changes into account and (2) ignoring the signs and taking the arithmetic means. Similar averaging is carried out taking the datum levels as 2 km and 4 km. One of the interesting results of the analysis is that while on the average, a positive or negative change of pressure at 2 or 4 km signifies a change in the same direction as levels up to 14 km, a positive or a negative change of pressure which is observed at the surface is not associated with similar changes except to a small height. A change of pressure at a 2 km station is therefore a more significant indication of atmospheric change than a similar change at a low level station. *Subject Headings:* **1. Interdiurnal pressure variations 2. Interdiurnal temperature variations 3. Upper atmosphere 4. Agra, India.**—*Author's abstract.*

TURBULENCE

See also: **Wind profiles** (Hay), 6.3–157; **Wind distribution** (Kimura), 6.3–196; **Flying saucer** (Kraus), 6.3–247; **Revolving cloud,** 6.3–250.

6.3–153 551.551:551.576.11:629.13

Bundgaard, Robert C., **Observations on billow clouds and deforming exhaust trails from aircraft.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 182–187. 8 figs., 7 refs.) **DWB**—Wave-lengths and propagation speeds were measured from time-lapse telephotos of cirrus and exhaust trails. Several photos and composite tracings are reproduced. They show evidence of numerous small (2–10 mi) and short-lived (5–20 min) turbulent disturbances. The structure of contrails is related to the nature of the exhaust particles. *Subject Headings:* **1. High level turbulence 2. Exhaust trails.**—*C.E.P.B.*

6.3–154 551.551:551.557

Clem, LeRoy H., **Clear-air turbulence at high levels.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 193–198. 5 figs., 5 refs.) **DWB**—Pilots' turbulence reports were studied in relation to improved upper wind data. A close relation, illustrated by charts and sections for March 18–20, 1953, is found between clear-air turbulence and centers of maximum wind speed moving along the jet, associated with great vertical wind-shear near the tropopause. *Subject Heading:* **1. Clear air turbulence.**—*C.E.P.B.*

6.3–155 551.551:551.511

Deacon, E. L., **Some measurements of the shearing stress and its variation with height in the lowest 100 feet of the atmosphere.** (In: American Meteorological Society and Royal

Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 238–239. 6 refs. **DWB**—Measurements of vertical turbulent flexes of heat, momentum and water vapor over a meadow near Melbourse are used to calculate eddy stress at 1.5 m and surface drag. In the expression $K=k(1-\sigma Ri)^{\frac{1}{2}}K$ was 0.39 and σ about 8.2. Scale of turbulence was much greater in horizontal than vertical direction. At 25 m eddy stresses were much more variable than at 1.5 m. *Subject Headings:* **1. Turbulent heat transfer 2. Turbulent momentum transfer.**—*C.E.P.B.*

6.3–156 551.551 551.513.1

Eady, E. T., **The maintenance of the mean zonal surface currents.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 124–128. eq.) **DWB**—Cause of correlation of westerly and southerly components of velocity is discussed. Hadley-type circulations cannot explain main momentum transfer. Mixing by gross-turbulence cannot produce ordered motion. Author then describes a hydrodynamical approach leading to generation of westerlies where Richardson number is a minimum, with easterlies on either side, much of the virtual transfer of angular momentum occurring during actual growth stage of large-scale disturbances. *Subject Heading:* **1. General circulation.**—*C.E.P.B.*

6.3–157 551.551:551.554(26)

Hay, J. S., **Some measurements of vertical profiles of wind speed and gustiness over the sea.** *Porton, England. Chemical Defence Experimental Establishment, Porton Technical Paper*, No. 428, **1954.** 16 p. 5 plates, 4 tables, 8 refs., 8 eqs. Mimeo. **GB-MO**—Observations were made in off-shore winds at heights of 0.5–8 m above sea on a large floating platform 800 m east of a N–S coastline in E. Britain, with air temperature at 1 m and sea temperature. With zero temperature gradient the observations were fitted by the logarithmic expression for aerodynamically rough flow, the roughness parameter increasing from 0.02 at 5 m/s to 0.25 at 9 m/s at 2 m. With a temperature lapse the flow was less rough but not smooth. With inversion, wind speed increased with log (height) near surface but more rapidly at higher levels. Gustiness was measured at 1 and 2 m and ratios of lateral and vertical gusts to mean speed calculated. Lateral gustiness was relatively great. *Subject Headings:* **1. Gustiness 2. Wind profiles 3. North Sea.**—*C.E.P.B.*

6.3–158 551.551

Panofsky, Hans A. and McCormick, Robert A., **Properties of spectra of atmospheric turbulence at 100 metres.** *Royal Meteorological Society, Quarterly Journal*, 80(346):546–564, Oct. **1954.** 17 figs., 4 tables, 15 refs., 7 eqs. **DWB**—Aerovane and bivane records at 100 m at Brookhaven, Long Island, are analyzed for spectra of vertical and horizontal turbulence in relation to temperature gradient 11–125 m, vertical wind profile and radiation intensity. At frequencies of 100+ cycles per hour the intensity is proportional to (wind speed)^2, independent of radiation, but at lower frequencies the ratio increases with increasing radiation. The spectrum ratio of vertical and horizontal co-velocity to vertical velocity is given by 0.25 $n^{-1}(\bar{V}_3-\bar{V}_1)(z-z_1)^{-1}$, where suffixes 1, 3 refer to 11 and 125 m. Relations of horizontal and vertical velocity components to frequency and radiation are examined; eddies are low and wide with low radiation, tall with high radiation. Variations of turbulence spectra with height (23 and 91 m) and with land or sea wind trajectory are discussed. *Subject Heading:* **1. Turbulence spectrum.**—*C.E.P.B.*

6.3–159 551.551:551.515.2

Schloemer, R. W. and Flanders, F. A., **An interesting anemograph record.** *Monthly Weather Review*, 82(4):101–103, April **1954.** 3 figs., ref. **MH-BH**—During the passage of a hurricane on Sept. 22, 1948, the anemograph record drum was speeded up to 60 times normal rate for 5 min (11:12–11:17 a.m.) at the Hurricane Gate Station No. 1 at the SW shore of Lake Okeechobee, Fla. The location and exposure of the anemometer are shown on 2 charts, and the anemograph record before, during and after the speed-up period is reproduced. Large scale turbulent elements are clearly shown (15–20 sec. duration) and superimposed on these more or less rhythmic squalls are gusts of 10 sec and others of 2 sec duration. Sharp changes

in direction coincide with lulls. The record before and after the speed-up is blurred, but reveals peak gusts of 62 instead of the 52 mph peak gusts of the speed-up period. *Subject Headings:* **1. Hurricane turbulence records 2. Anemographs 3. Lake Okeechobee, Florida.** —*M.R.*

6.3–160 551.551:551.558.21

Scorer, R. S., **Turbulence generated in standing waves.** *Royal Meteorological Society, Quarterly Journal*, 80(346):629–630, Oct. 1954. 5 refs., 4 eqs. **DWB**—Clear air turbulence in standing waves caused by mountains is attributed to shear large enough to be unstable, forming in extreme cases discontinuities of shear and horizontal velocity. It may be recognized in radiosonde records by discontinuities of temperature lapse. *Subject Heading:* **1. High level turbulence.**—*C.E.P.B.*

6.3–161 551.551

Voge, Jean, **Fluctuations du champ électromagnétique dues à la turbulence, à l'extrémité d'un trajet de propagation en visibilité directe.** [Fluctuations of the electromagnetic field due to turbulence on the end of a propagation trajectory with direct visibility.] *Académie des Sciences, Paris, Comptes Rendus*, 237(4):351–353, July 27, 1953. 3 refs. **DWB**—Theoretical discussion for ultrashort waves and light waves, applying the TAYLOR spectrum of turbulence, which gives simpler solutions than proposed by MEGAW, who used KOLMOGOROV's spectrum. *Subject Headings:* **1. Turbulence spectrum 2. Radio meteorology.**—*A.A.*

6.3–162 551.551

Kurihara, Michnori, **Note on the hydrodynamical roughness length of a grass-field.** *Fukuoka, Japan. Kyushu University. Research Institute of Applied Mechanics, Reports*, 1(1):1–8, 1951. 5 figs., 11 eqs. **MH-BH**—The author tries to verify his opinion that the roughness length of grass fields is independent of the degree of instability of the atmosphere. He modifies PRANDTL's assumption for mixture length introducing an additional factor dependent on the configuration of the grass. Characteristic curves are obtained which show the variation of the roughness length with velocity. *Subject Headings:* **1. Turbulence 2. Mixing length 3. Roughness effects.**—*A.A.*

6.3–163 551.551.5:551.511:536.2

Karush, William, **Values for the eddy diffusion coefficient.** *U. S. Atomic Energy Commission, AECD-3256*, June 8, 1945. 9 p. 5 figs., 8 refs., eqs. On reverse of t-p: Work performed under Contract No. W-7401-eng-37. **DWB**—General treatment of problem of eddy diffusion in turbulent flow between parallel flat plates. Theory of momentum transfer, vorticity transfer, transfer of mass and heat are reviewed in the light of work of NIKURADSE (1929), TAYLOR (1935) and KALINSKE and PIEN (1944). *Subject Headings:* **1. Eddy diffusion 2. Momentum transfer theory 3. Vorticity transfer theory. I. Contract W-7401-eng-37.** —*M.R.*

6.3–164 551.551.53:551.511

Jehn, Kenneth H. and Gerhardt, John R., **A preliminary study of the eddy transfer of heat near the earth's surface.** Texas. University. Electrical Engineering Research Laboratory, Contract N6onr-266, Task Order 2, Project NR-082-005, Report No. 37, March 1, 1950. 13 p. 6 figs., 5 refs. **DWB**—Preliminary time and height distribution of the coefficient of eddy conductivity are presented for three different 24-hour periods for locations in east central Texas and southern Arizona. The methods used in obtaining representative temperature profiles and in computing values of the coefficient are described. *Subject Headings:* **1. Eddy conductivity 2. Heat transfer 3. Temperature profiles 4. Texas 5. Arizona. I. Contract N6onr-266, Task Order 2 II. Texas University. Electrical Engineering Research Laboratory.**—*Authors' abstract.*

WIND

6.3–165 551.553.11(54)

*Sen Gupta, Prabhat Kumar and Chakravortty, Keron Chandra, **Land breeze at Calcutta, Alipore.** *India. Meteorological Dept., Scientific Notes*, 9(108):73–80, 1946. 13 tables,

4 figs. **DWB**—In Calcutta the land breeze sets in during some calm nights of non-monsoon months as light puffs of wind, and is associated generally with a rise of temperature and a fall of relative humidity. 254 cases of land breeze were found during the years 1935 to 1940. The annual and monthly distribution, times of onset, duration, direction and velocity are given in tables. Frequencies of rise of temperature and fall of humidity associated with this breeze are shown in Tables VIII and IX. *Tables Xa* and *Xb* give the most favorable condition of wind at 17 hours for the setting in of such a breeze. The probability of occurrence of fog after the onset of land breeze is very small. Comparative data of Dum Dum and Calcutta for a few months in 1941 have been discussed. *Subject Headings:* **1. Off shore winds 2. Calcutta, India.**—*Authors' abstract.*

6.3–166 551.553.22(52)

Kadowaki, T., **On the wind "Yamase" (I.).** *Journal of Meteorological Research, Tokyo,* 3(2):51–62, Jan. **1951.** 12 figs., 6 tables, 4 refs. In Japanese; English summary p. (2). **DWB**—The "Yamase" wind, which produces low summer temperatures in the Senriku district, blows in across the seashore of Senriku as an easterly wind originating in the Okhotsk high, lasts 3–7 days, and occurs during cloudy weather, low temperature with rainfall and during high humidity with fog. It is related to the sea water temperature. *Subject Headings:* **1. "Yamase" wind 2. Sea temperatures 3. Senriku district, Japan.**—*From author's abstract.*

6.3–167 551.553.6:551.311.31

*Coaldrake, J. E., **The sand dunes of the Ninety-Mile Plain, Southeastern Australia.** *Geographical Review,* 44(3):394–407, July **1954.** 11 figs., table, 18 refs. **DLC**—In this article on soils and vegetation of a desert area of Southeast Australia, a section is devoted to the climate, including wind roses and frequency data (8 direction and 4 velocity groups) for Serviceton, Victoria (most of the Ninety-mile Plain is in South Australia). The greatest emphasis is on formation and structure of dunes in this desert. *Subject Headings:* **1. Wind frequency data 2. Sand dunes 3. Ninety-Mile Plain, South Australia 4. Serviceton, Victoria.**—*M.R.*

6.3–168 551.553.6(52)

Kimura, Y. (*Aomori Agri. Exp. Station*), **On the prevailing easterlies during the summer season in Aomori Prefecture, 1949.** *Journal of Agricultural Meteorology,* Tokyo, 6(3/4):126–128, Aug. **1951.** 2 figs., 2 tables. In Japanese; English summary p. 128. **DWB**—In this report the author collected the data observed through the summer season of five months from May to Sept. at 31 observatory points of Aomori Prefecture in 1949, defined the frequency of the "(NE+SE)+ENE+ESE+E" winds as the prevailing easterlies, and classified them into three groups by $\bar{x}$ and s. The characteristics of each of these groups and topographical properties of the regions in which they prevail are described. *Subject Headings:* **1. Wind frequencies 2. Aomori Prefecture, Japan.**—*From author's abstract.*

6.3–169 551.553.8

Ashmore, S. E., **Gale of December 17, 1952.** *Meteorological Magazine,* London, 82(976): 313–315, Oct. **1953.** fig. **MH-BH**—Comparison of record gust at Cranwell (111 mph) with other records (111 mph at Quilty, 113 at St. Ann's Head (1945). *Subject Headings:* **1. Gales 2. British Isles.**—*C.E.P.B.*

6.3–170 551.553.8:551.46

Frankcom, C. E. N., **Hurricane force winds at ocean weather station "India."** *Meteorological Magazine,* London, 82(973):218–219, July **1953.** **MH-BH**—O.W.S. **"Weather Watcher,"** 59°N, 19°W, Dec. 22, 1952, experienced SSW–SW winds of force 12, with seas up to 40 ft. Some damage was done. *Subject Headings:* **1. Gales 2. Wind waves 3. North Atlantic.**—*C.E.P.B.*

6.3–171 551.553.8(261.2)

Rodewald, Martin, **Welche Windstärke und Böenstärke ist in der Nordsee möglich?** [What wind force and squall force is possible in the North Sea?] *Wetterlotse,* No. 76:197–200,

Sept. 1954. table. **DWB**—On Jan. 31, 1953 a gust in Orkneys reached 107 kn, and 100 kn over North Sea is quite possible. In Dutch hurricane ratio maximum gust/mean wind was 3/2, and this can be used to convert forecast mean wind speed to maximum gust. *Subject Headings:* **1. Squalls 2. North Sea.**—*C.E.P.B.*

6.3–172 551.555 551.586:612.275

Myers, W. A. and Price, Saul, **Kona weather and the incidence of asthma in children in Honolulu.** *Hawaii Medical Journal*, 13:181–188, Jan./Feb. 1954. 7 figs., 3 tables, 9 refs. Abstracted from reprint. **MH-BH**—A brief summary of the literature on the effect of pressure, humidity, wind speed and direction and temperature upon the production of asthmatic symptoms is presented. The weather and climate of the Hawaiian Islands, in particular the Kona weather type, are discussed. The effect of Kona weather upon the manifestation of asthma is examined in a population of 1259 asthma cases and it is found that no definite relationship exits between Kona weather and asthma attacks. *Subject Headings:* **1. Kona storms 2. Asthma 3. Honolulu, Oahu.**—*I.L.D.*

6.3–173 551.555.3

Georgii, Walter, **Dinamica del viento zonda en Mendoza.** [Dynamics of the Zonda wind in Mendoza.] *Mendoza, Argentina. Universidad Nacional de Cuyo. Departamento de Investigaciones Cientificas, Anales*, 1(2):109–119, 1953. 4 figs., table. Spanish and German summaries p. 109. **DWB**—It is shown that the warm Zonda wind of Mendoza owes its origin to a cold front coming from the Pacific and crossing the Cordillera. Cold polar air mass descends the east side of the Cordillera from the ridge at a height of 5.5 km into the lowland, becomes dynamically warmed so that it rises over the lowland as a warm wind. It descends with a velocity of about 15 cm/sec. *Subject Headings:* **1. Zonda 2. Mendoza, Argentina.**—*I.L.D.*

6.3–174 551.555.9(66)

Higgins, J. J., **Trade winds and line squalls.** *Weather*, 9(2):64, Feb. 1954. **MH-BH**—Account of West African line squalls. The characteristics are accounted for by entrainment of moist SW air into an area of violent convection due to orographic lifting. They travel far out into Atlantic. *Subject Headings:* **1. Line squalls 2. West Africa.**—*C.E.P.B.*

WIND EFFECTS

See also: **Wind power data** (Studiengesellschaft Windkraft e.V. Stuttgart), 6.3–9; **Shelter belts** (George), 6.3–11.

6.3–175 551.556:551.465

Hay, R. F. M., **A verification of Ekman's theory relating wind and ocean current directions using ocean weather ships' data.** *Marine Observer*, 24(166):226–230, Oct. 1954. 2 tables, 2 refs. **MH-BH**—Five-day vector means of winds and ocean currents at Ocean Weather Stations I and J are tabulated. Mean deflection of current from wind (42° in 59–60°N, 29° in 52½–54°N) agrees with EKMAN's theory. Wind factor $u_* \sin \phi / u_a$ (u_* = mean vector current, u_a mean vector wind, ϕ latitude) was near 0.04, five times value found by C. S. DURST in 1924. *Subject Headings:* **1. Wind driven currents 2. Ekman's theory. I. Durst, C. S.**—*C.E.P.B.*

6.3–176 551.556:551.465(269) 551.526.6:551.46(269)

†Koopmann, Georg, **Entstehung und Verbreitung von Divergenzen in der oberflächennahen Wasserbewegung der antarktischen Gewässer.** [The formation and distribution of divergences in the near surface circulation of Antarctic waters.] *Deutsche Hydrographische Zeitschrift, Erganzungsheft*, 2, 1953. 38 p. 18 figs., 2 plates, 5 tables, 76 refs. German, English and French summaries p. 3–4. **DWB**—The present knowledge of Antarctic currents is summarized. Singularities (convergences and divergences) are related to winds induced by the atmospheric pressure field, causing divergences and upwelling, and convergences in westerly currents. Near the ice-edge, variations of density due to temperature and salinity also play

an important part. The surface and vertical structure and circulation of Antarctic waters are analyzed. *Subject Headings:* **1. Wind driven currents 2. Sea temperatures 3. Antarctic Ocean.**—*C.E.P.B.*

6.3–177 551.556:551.46:622.323(265.6)

Meteorological aspects of marine drilling in the South China Sea. *Marine Observer*, 24(166):216–221, Oct. **1954.** 4 figs., **MH-BH**—To study possibility of drilling for oil in 30 ft of water 5000 ft off-shore of N.W. Borneo, observations were made of wave amplitude and period, tides and winds (with Dines anemometer). These are illustrated, with wind roses for June 1951 and June 1952. Numbers of workable days were calculated. *Subject Headings:* **1. Wind waves 2. Oil drilling 3. China Sea.**—*C.E.P.B.*

6.3–178 551.556.2:551.526

Asai, T. (*Res. Inst. of National Resources, Japan*), **The effects of wind break for going up** (*sic*) **the water temperature.** *Journal of Agricultural Meteorology*, Tokyo, 7(3/4):140–142, Nov. **1952.** 2 figs., table. In Japanese; English summary p. 142. **MH-BH**—The author reports simultaneous measurements of water temperature made during several days in basins exposed to wind and similar basins placed behind windbreaks. Both stagnant water and water whose temperature was 10° below air temperature at the time of exposure were measured. Temperatures were taken at various depths. Obtained temperatures are presented in a table and a graph. A photograph shows the experimental site. *Subject Headings:* **1. Windbreaks 2. Wind effects 3. Water temperatures.**—*G.T.*

6.3–179 551.556.2:551.584

†D'iachenko, A. E., **Les i urozhai.** [Forest and yield.] *Akademiia Nauk SSSR. Institut Lesa. Nauchnye Voprosy Polezashchitnogo Lesorazvedeniia*, No. 1:285–295, **1951.** 5 tables, bibliog. **DLC**—Literature review on the favorable influence of forest shelter belts on yield, improving the microclimate, retention of snow and soil moisture conditions. The transpiration coefficient decreases and the transpiration productivity increases, approaching the shelter belts. *Subject Headings:* **1. Shelter belts 2. Microclimatic control 3. Crop yield 4. Transpiration.**—*A.A.*

6.3–180 551.556.2:551.584

Gael', A. G., **Polezashchitnoe lesorazvedenie v Severnom Priaral'e.** [Shelter belts forestation in the northern Aral region.] *Akademiia Nauk SSSR. Institut Lesa. Nauchnye Voprosy Polezashchitnogo Lesorazvedeniia*, No. 1:309–327, **1951.** 21 figs., 2 tables. **DLC**—A number of microclimatic profiles show the influence of shelter belts on snow cover and soil moisture (isopleths up to 200 cm), depending on air temperature and precipitation. *Subject Headings:* **1. Microclimatic profiles 2. Shelter belt effects 3. Soil moisture.**—*A.A.*

6.3–181 551.556.2

Iizuka, Hajime, **Research on so called "blow-in" at the side end of a windbreak.** *Tokyo, Japan. Forest Experiment Station, Bulletin*, No. 56:219–223, Dec. **1952.** 3 figs. In Japanese. **DWB**—Sketches show the wind structure at the side of a complicated windbreak, as taken from wind recorders. Also the frequencies of winds from various rhumbs is shown by scatter diagrams (Polar). *Subject Headings:* **1. Windbreak effectiveness 2. Wind effects.**—*M.R.*

6.3–182 551.556.4:632.9

Srivastava, A. S. and Hull, W. B., **Effect of wind direction on the pea aphid control during dust application.** *Science and Culture*, Calcutta, 18(4):191–192, Oct. **1952.** 3 figs., table, 5 refs. **DLC**—A table showing the effectiveness of insecticides applied with and against 12 mph wind is presented. It shows better control, by about 5% in the former case. This is attributed to the fact that head wind frequently blows the canvas apron away from the rear of the duster and disperses the insecticide into the air. *Subject Headings:* **1. Crop dusting 2. Wind effects.**—*G.T.*

6.3–183 551.556.4:581.12

Herbst, Walter, **Zur Frage der Ablösbarkeit des Blütenstaubes einiger Wind- und Insektenblütler bei verschiedenen Windgeschwindigkeiten.** [Detachability of pollen of some wind and insect pollinated flowers at different wind speeds.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen,* **1951/1952.** p. 121–123. 6 figs. **DWB**—This experimental wind channel study shows graphically the pollen density, dependent on wind speed, for grapevine and five garden vegetables. *Subject Headings:* **1. Pollen 2. Wind effects.**—*A.A.*

6.3–184 551.556.4:551.311.31

Matsuzawa, I. and Kobayashi, T., **The wind and the coastal sand dune at Shonai.** *Journal of Meteorological Research,* Tokyo, 4(5):230–240, Aug. **1952.** 12 figs., 6 tables. In Japanese; English summary p. (16). **MH-BH**—Data on annual speed and directional distribution and duration of storms and wind at Shonai, Niijata, Sakata and Sakai are presented for the period 1937–1950. Values of all weather elements are given for Feb. 11–15, 1951. These include observed values and frequency distribution of turbulence at six points and vertical distribution of sand particles from 5 to 60 cm from the ground (obtained with a horizontally placed cylindrical collector). Topographical profiles are illustrated and the formation of dunes is discussed. *Subject Headings:* **1. Wind effects 2. Sand dunes 3. Japan.**—*G.T.*

UPPER AIR WINDS

See also: **Upper air wind computation** (Graystone), 6.3–34; **Upper air analysis** (Ligda, others), 6.3–40; **Upper wind forecasting** (Sutcliffe, Sawyer), 6.3–78; **Jet stream** (McIntyre, Lee), 6.3–109; **General circulation** (Palmer), 6.3–110; **Clear-air turbulence** (Clem), 6.3–154; **Upper air wind variations** (Kraus), 6.3–259; **Jet stream elec. effects** (Falconer), 6.3–364; **Atmos. elec. & jet streams** (Graystone), 6.3–365.

6.3–185 551.557:551.524.7:551.596.1

Denver. University. Institute of Industrial Research, **Determination of atmospheric winds and temperatures in the 30- to 60-kilometer region by acoustic means.** Contract AF 19(122)-252, Quarterly Progress Reports, No. 8, 9, 10, 11, March 1–May 31; June 1–Aug. 31, **1952.** Sept. 1–Nov. 31, 1952; Dec. 1, 1952–Feb. 28, 1953, pub. June 20, Sept. 3, Dec. 12, 1952, March 10, **1953.** 4 pieces. foot-refs., figs. (some fold.), eqs. **DWB**—Report No. 8 gives results of observations using the source detector array centered near Limon, Colo. One round of field operations was performed in April and one in May 1952 and a special test operation performed on April 1, 1952 to determine the direction of location of the second zone of audibility from the firing sites. An automatic recorder-operator was designed and constructed by A. Auten. This device operates the GR-8 sound ranging equipment unattended and was used during the two field tests described. Report No. 10 gives preliminary results of the New Mexico T-day observation on Oct. 20–24, 1952 and a map and description of the array of stations, etc. Out of 618 scheduled records, at least 230 indirect compressional waves were received over an azimuth range of 220°. The results of high-level wind and temperature calculations for rounds 39–41 are also presented. Report No. 11 gives preliminary results of upper level and azimuth—shift calculations of data acquired during Round 5 of the New Mexico T-day operation on Oct. 22, 1952. Temperatures in agreement with the Richardson-Kennedy mean temperature curve were observed. Wind azimuth was constant at 270° from 25 to 55 km and speed ranged from 6 m/sec at 20 km to 50 m/sec at 55 km. A preliminary model using a hyperbolic-cosine function to define ray-velocity as a function of altitude is presented. Comparisons are made between results using this model and those using the two gradient-profile method now used. Advantages are cited. *Subject Headings:* **1. High level winds 2. Acoustical soundings 3. Temperature of the stratosphere. I. Contract AF 19(122)-252.**—*From author's abstract.*

6.3–186 551.557:551.524.7:551.596.1

*Kennedy, William B.; Brogan, Lee; Sible, Norman J. and Auten, Allen C., **Atmospheric winds and temperatures in the 30-to-60-kilometer region over Eastern Colorado as determined by acoustical propagation studies 31 Oct. 1951 to 28 Aug. 1952.** Denver. Univ. Denver Re-

search Institute, Contract AF 19(122)-252, Scientific Report, No. 3, Feb. 19, 1954. 41 p. 7 tables, 6 figs., eqs. **DWB**—Approximately one measurement per month of upper atmosphere winds and temperatures was made during the period 31 Oct. 1951 through 28 Aug. 1952 by means of acoustical propagation studies. Operations were centered at approximately 39°N lat., 103°40′W long. (near Limon, Colorado), and extended radially about 200 km. A variation in azimuth and distance from sound source to recorder positions permitted the separation of wind and temperature components of the observed upper atmosphere sonic velocity gradients. This study was a continuation of previous work (21 July 1950 through 31 May 1951) initiated to determine the seasonal variation of high-altitude winds and temperatures, and was performed for the purpose of checking previous conclusions. Although acceptable agreement with earlier conclusions was generally found, no valid statistical comparison could be affected because of limitations of the data. The previously observed tendency of the wind vector to move clockwise as the seasons advanced was confirmed by this study. *Subject Headings:* **1. High level winds 2. Acoustical soundings 3. Temperature of the stratosphere. I. Denver. Univ. Denver Research Institute II. Contract AF 19(122)-252.**—*Authors' abstract.*

6.3–187 551.557.31 551.524.71

*Kennedy, William B.; Brogen, Lee; Sible, Norman J. and others, **Diurnal variations of atmospheric winds and temperatures in the 30- to 50-kilometer region over southwestern New Mexico by acoustical propagation studies Oct. 20–24, 1952.** Denver. Univ. Denver Research Institute, Contract AF 19(122)-252, Scientific Report, No. 4, April 15, 1954. 65 p. 12 figs., 9 tables, 12 refs., numerous eqs. **MH-BH**—As a part of Operation T-day, ten measurements of upper atmosphere winds and temperatures were made by means of acoustical propagation studies during the period 20–24 October 1952. The results of these ten measurements as obtained by employing the method of calculation synthesized and developed by A. P. CRARY are presented in this paper. A new method for determining upper level winds by use of azimuth-shift data is also presented. An analysis of these results to determine the existence of any diurnal variation of upper atmosphere winds and temperatures was accomplished. These studies established that the upper atmosphere temperatures increased as the winds decreased with the advance of time of day through the daylight hours. Minimum temperatures and maximum winds generally occurred about 10 A.M. *Subject Headings:* **1. Acoustical propagation 2. Diurnal upper air wind variations 3. Diurnal upper air temperature variations 4. New Mexico. I. Denver. Univ. Denver Research Institute II. Contract AF 19(122)-252 III. Brown, Raymond A.**—*Authors' abstract.*

6.3–188 551.557:551.542.1

†Machta, Lester, **Study of the observed deviations from the geostrophic wind. 1948.** 160 p. 23 tables, 47 figs., Bibliog. p. 150–160. Carbon of typescript. Thesis [Sc.D.].—Massachusetts Institute of Technology, **1948.** Biog. data, p. [162]. **DWB**—The basic equations and theory of geostrophic and non-geostrophic motion are set forth and the literature on this subject reviewed. A great number of theoretical studies have been made by investigators in Scandinavia, Germany, England and the United States since GULDBERG and MOHN (1876) and HESSELBERG (1915). However, very little extensive observational evidence was presented until recently. Pt. II of the thesis consists of an analysis of rawin and rabal data for June–Sept. 1947, and for Jan. 1946 and 1947 and Dec. 1946 and comparison with geostrophic winds for 850, 700, 500, 300 and 200 mb surfaces. A total of 5400 cases were examined and the accuracy of the wind observations tested. Among the conclusions brought out were the fact that in summer directions are toward higher pressure and in the winter toward lower pressure as a rule, and deviations are greater than probable instrumental error. *Subject Headings:* **1. Geostrophic wind theory 2. Upper air wind observation accuracy 3. Deviations from geostrophic winds.**—*M.R.*

6.3–189 551.557(91/2)

*Schmidt, F. H., **Upper winds over Indonesia and Western New Guinea.** *Indonesia Djawatan Meteorologi dan Geofisik, Verhandelingen*, No. 45, **1952.** entirely charts (fold.) unpaged. **DWB, DLC**—Seasonal (Dec., Jan. and Feb.; March, April and May; June, July and Aug.; Sept., Oct. and Nov.) Baillie type wind rose charts are presented for 1000, 3000

7000, 10,000, 15,000 and 20,000 ft levels for area from 95°–140°E and 6°N to 10°S, including all of Indonesia and western New Guinea (Sumatra, Java, Borneo, Celebes, etc.), using data from 30 stations (only 10 stations at 20,000 ft level remain). *Subject Headings:* **1. Upper air wind rose charts 2. Upper air climatology 3. Indonesia 4. New Guinea.**—*M.R.*

6.3–190 551.557:551.515.127

Teweles, Sidney, Jr., **Jet-stream detail with respect to other meteorological factors.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 188–192. 4 figs., 3 refs.) **DWB**—Generalized patterns are presented of 300 mb isotachs at different stages in a polar-front wave, followed by analyses of actual cases. With developing waves an intensifying jet-stream can be expected about 500 mi upstream from the point where the surface front is advancing most rapidly. *Subject Heading:* **1. Jet stream.**—*C.E.P.B.*

6.3–191 551.557.2

Bannon, J. K., **Some aspects of the mean upper-air flow over the earth.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 109–121. 17 figs., 23 refs.) **DWB**—Preliminary results of a revision of **Upper winds over the world** (*see* 10–117, Oct. 1950, *MAB*) are given as world isobars for Jan., April, July and Oct. for MSL, isohypses for 300 mb level and stream-lines at 200 mb, including positions of jet streams. Vertical cross sections of potential temperature and mean zonal flow in 45°E, 140°E and 80°W in Jan. 1951 and 45° and 140°E in July 1951 are shown and positions of jet stream discussed, also in April and Oct. Equatorial easterlies at about 200 mb are described; they are strong over the Indian Ocean in July and less strong in Jan. (weak in April and Oct.); causes of this are discussed. *Subject Heading:* **1. Upper air wind charts.**—*C.E.P.B.*

VERTICAL CURRENTS

See also: **High level turbulence** (Scorer), 6.3–160.

6.3–192 551.558.1:797.5

Ivans, W. S., Jr., **Cross country soaring.** *Soaring*, Dallas, Texas, 18(1):23–24, Jan./Feb. **1954.** 3 figs. **DWB**—Three types of soaring (from a meteorological standpoint) are described and conditions illustrated diagrammatically: 1) thermal soaring, 2) cold front soaring and 3) ridge or wave soaring. Record distance (535 mi) and other cross country flights have been made during thermal soaring conditions. However, the standing wave may prove the better aid to long distance flight (1000 mi or more possible). Restrictions upon routes and choice of goal, and navigational aids are outlined. *Subject Headings:* **1. Soaring 2. Thermals 3. Cross country sailplane flights.**—*M.R.*

6.3–193 551.558.1:551.578.11

Upward movement of rain. Mediterranean Sea. *Marine Observer*, 24(165):139–140, July **1954.** sketch. **MH-BH**—On Oct. 27, 1953, as a Cu cloud passed over Conajeta Island rain fell from a turret and rose again up the mountain slope. Attributed to strong convection. *Subject Headings:* **1. Vertical currents 2. Rainfall structure.**—*C.E.P.B.*

6.3–194 551.558.1:797.5

Yates, A. H., **Recent progress in gliding.** *Royal Aeronautical Society, Journal*, 58(523): 447–455, July **1954.** 10 figs., 30 refs. **DWB**—Successive world and British height and distance records for gliders are shown in diagrams. Progress in design of sailplanes, aerodynamic developments and instruments is summarized. A brief account is given of sources of power, including hill lift, lee waves, thermals and cumulus clouds. *Subject Headings:* **1. Gliding 2. Vertical currents.**—*C.E.P.B.*

6.3–195 551.558.2

Furuichi, M. and Saito, T., **On the computation of vertical velocity.** *Journal of Meteorological Research*, Tokyo, 4(9):685–693, Feb. **1953.** 2 figs. In Japanese; English summary

p. (42). **MH-BH**—A numerical method for computing velocities of the vertical component of atmospheric motion is developed. Applying the method to data from Yonago, Japan, the author presents time sections of vertical motion for July and Nov. 1950. The relation between vertical velocity and other phenomena (temperature variations, tropopause variations, wind direction, fronts, etc.) is graphically represented and discussed. *Subject Heading:* **1. Vertical velocity.**—*G.T.*

6.3–196 551.558.21:551.552(52)

*Kimura, Y., **On the topographical deviation of the prevailing easterlies during June in Aomori Prefecture.** *Journal of Agricultural Meteorology*, Tokyo, 7(1):27–29, Dec. **1951.** 2 figs., 3 tables, 6 refs. In Japanese; English summary, p. 29. **DWB**—Wind directions prevailing at 5 Pacific coastal points and corresponding inland points are examined. It is found that the prevailing easterlies usually deviate to south on the east side and to north on the west side of the Ōu mountain system. The data for this study were obtained in June 1949 and are presented on tables and charts. *Subject Headings:* **1. Wind distribution 2. Topographic effects 3. Aomori Prefecture, Japan.**—*G.T.*

6.3–197 551.558.21:551.43

†Corby, G. A., **The airflow over mountains. A review of the state of current knowledge.** *Royal Meteorological Society, Quarterly Journal*, 80(346):491–521, Oct. **1954.** 7 figs., 35 refs., 24 eqs. **DWB**—Observational evidence from clouds and experience of pilots of gliders and aircraft is briefly summarized. The theoretical work of P. Queney and R. S. Scorer on the perturbation of laminar isentropic frictionless flow over an ideal ridge is discussed in detail with the relevant equations and streamlines; that of G. Lyra and R. R. Long is briefly considered. Scorer, using a smaller scale than Queney, emphasizes the importance of stability ("barostromatic flow") and predicts the occurrence of lee waves. Pt. 4 discusses the limitations of wind tunnel experiments. Pt. 5 describes the field investigations of J. Förchgott with gliders and light aircraft over mountain areas. His diagrams of laminar, standing eddy, wave and rotor streaming and criteria for their occurrence are reproduced (figs. 6, 7). Finally, applications to aviation forecasting and safety heights are referred to. *Subject Headings:* **1. Lee waves 2. Orographic effects.**—*C.E.P.B.*

6.3–198 551.558.21:797.5

Neumann, G. S. (*Cambridge Univ. Gliding Club*), **First Mynd lee wave.** *Gliding*, London, 4(3):128–129, Autumn **1953.** diagr. **DWB**—In connection with an account of a soaring flight utilizing the Long Mynd lee wave with a 25 kn easterly wind (prior to 1953 all flights were made in westerly winds), the author describes wind, lift and cloud conditions encountered or observed over Long Mynd (halfway between Liverpool and Larkhill, Eng.) and surrounding areas. Tephigrams showing characteristics of the wave are presented. *Subject Headings:* **1. Lee waves 2. Gliding 3. Long Mynd, England.**—*G.T.*

6.3–199 551.558.21:797.5

Prestwich, R. H. (*Midland Gliding Club*), **The April wave, I.** *Gliding*, London, 4(3): 129–130, Autumn **1953.** Jones, Stan, **The April wave, II.** *Ibid.*, p. 130–131. diagr. **DWB**—Atmospheric conditions encountered over Long Mynd (near Liverpool, Eng.) during two soaring flights in easterly wind are described. The diagram presented shows a side view of the flight path, orographic conditions and location of clouds. *Subject Headings:* **1. Lee waves 2. Gliding 3. Long Mynd, England.**—*G.T.*

6.3–200 551.558.29:551.593.653:77

Paton, J., **Direct evidence of vertical motion in the atmosphere at a height of about 80 km provided by photographs of noctilucent clouds.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 31–33. 4 figs., 11 refs.) **DWB**—Origin of noctilucent clouds at 80 km is discussed. A display on July 24–25, 1950, soon after a brilliant aurora is described and illustrated; it showed marked turbulence. *Subject Headings:* **1. Vertical motion 2. Noctilucent clouds.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROLOGY

HUMIDITY

See also: **Potential evapotransp. meas.** (Mather), 6.3–12; **Humidity normals** (Day), 6.3–133; **Diurnal humidity variations** (Chiazzaro, Gonzáles), 6.3–135 and (Davis), 6.3–136; **Evaporation calculations** (Nagao), 6.3–205; **Observational data** (Robinson, others), 6.3–241; **Water content of air** (Thuman, Robinson), 6.3–242; **Ablation meas.** (Hubley), 6.3–266.

6.3–201 551.57:551.501.81

*†Gunn, K. L. S. and East, T. W. R., **The microwave properties of precipitation particles.** *Royal Meteorological Society, Quarterly Journal*, 80(346):522–545, Oct. **1954.** 7 figs., 7 tables, 64 refs., 17 eqs. **DWB**—Advances in radar meteorology since the fundamental paper by J. W. Ryde (*see* 2H–84, Aug. 1951, *MAB*) are reviewed. The principles of radar analysis of precipitation are summarized. Pt. 2 tabulates the refractive index absorption coefficient, back scatter and attenuation of water and ice at different temperatures and wave-lengths (see also p. 539). Pt. 3 sets out the theory of scattering and absorption by spheres of water, ice and water-coated ice. In Pt. 4 scattering by rain is taken up. Determinations of constants in $Z=aR^b$ are quoted and scattering and attenuation of different wave-lengths shown. Scattering and attenuation by snow, wet snow (including origin of "bright band") and clouds are briefly considered. Appendixes take account of attenuation by air and water vapor and note errors in the literature. *Subject Heading:* **1. Radar analysis of precipitation.**—*C.E.P.B.*

6.3–202 551.571:631.4

Bac, Stanisław, **O transpiracji porostu łakowego i parowaniu nieporośnietych gleb, na podstawie badań w lizymetrach o rzeczywistych stanach wód gruntowych.** [Transpiration from meadow vegetation and evaporation from bare soil on the basis of investigations made with lysimeters accommodated to actual ground water conditions.] *Poland. Państwowy Institut Hydrologiczno-Meteorologiczny, Wiadomości Służby*, 1(4):277–284, **1949.** 4 figs., 5 tables. **DWB**—Determinations of water consumption by bare soil and meadow vegetation were carried out from 1939–1943 in four varieties of soil (loess, peat, coarse sand and gravel) with lysimeters (1 m and 1.5 m deep) reaching the ground water. Instruments were installed on a valley slope at the Experimental Station of Pulavy. It has been found that under the climatic conditions of Pulavy (51°25′N, 21°57′E; mean annual temperature 7.8°C; precipitation 607 mm) there is a noticeable deficiency of rainfall during the vegetative period (April–Sept.) which is greater on overgrown areas and on higher situated places (with deeper level of ground water). Bare soils require less precipitation and even accumulate moisture during the warm period. *Subject Headings:* **1. Evapotranspiration 2. Soil moisture 3. Precipitation deficiency 4. Pulavy, Poland.**—*A.M.P.*

6.3–203 551.571.1:551.574.1

Carnegie Institute of Technology. Metals Research Laboratory, **Kinetics of nucleation in atmospheric phase transitions.** Contract AF 19(122)-185, [Research] Reports, No. 5–6, Sept., Oct. 1, **1951.** 2 pieces. diagr. (fold.) refs. **DWB**—In Report No. 5, a graph shows data on critical supersaturation of water vapor (changing to ice, or water drops) in Wilson cloud chamber at temperatures between 278° and 204°K. Two curves are presented, one for critical supersaturation with (higher values) and one without an electrical field. The two curves approach each other at −63°C, and evidence indicates that at this temperature there is a change in the mechanism of nucleus formation and that it is impossible to form ice crystals by freezing drops in absence of foreign nuclei. In order to reduce scatter of points on graph, a new thermostat bath and refrigeration system was constructed and is described and illustrated in Report No. 6. It permits temperature control to ±0.1°C. *Subject Headings:* **I. Supersaturation 2. Ice crystal formation 3. Nucleation. I. Contract AF 19(122)-185 II. Pound, G. M. III. Madonna, L. A. IV. Sciulli, Charles.**—*M.R.*

6.3–204 551.571.1:551.574.1

Sander, Adolf and Damköhler, Gerhard, **Übersättigung bei der spontanen Keimbildung in Wasserdampf.** *Naturwissenschaften*, Berlin, 31(39/40):460–465, Sept. 24, **1943.** DLC.

Translation by Mary Mahler as **Supersaturation in the spontaneous formation of nuclei in water vapor.** *U. S. NACA, Technical Memorandum*, No. 1368, **1953.** 19 p. 6 figs., 13 refs., 15 eqs. **DLC**—The supersaturation of water vapor required for spontaneous formation of nuclei was measured in the temperature range between +35° and −75°C. The influence of the presence of ions on the condensation process was found to disappear and a break in the critical supersaturation as a function of temperature curve was found at −62°C. In addition, the condensate particles were observed to scintillate at −62°C or lower. A modified form of the Volmer and the Becker-Döring equations for rate of nucleus formation is presented and compared with the experimental data. The temperature range of droplet-nucleus formation and crystal-nucleus formation are considered as two distinct (not overlapping) temperature regions separated by the melting point (−62°C) of two-dimensional surface phase. *Subject Headings:* **1. Supersaturation 2. Condensation nuclei 3. Translations. I. Mahler, Mary** (*trans.*).—*NACA abstract.*

6.3–205 551.571.3:551.573

Nagao, S., **The relation between the effective relative humidity and the amount of evaporation.** *Journal of Meteorological Research*, Tokyo, 4(12):1025–1028, March **1953.** 4 figs., 5 refs. In Japanese; English summary p. 62. **MH-BH**—Daily evaporation at Tokyo and other stations is plotted against relative humidity and wind velocity. Finally a good correlation is found with "Effective relative humidity," a quantity, defined in Japanese, which depends on humidity on preceding days (*see* 5.9–210, Sept. 1954, *MAB*). This relation is useful for fire risk warnings. *Subject Headings:* **1. Evaporation calculations 2. Japan.**—*C.E.P.B.*

6.3–206 551.571.3:632.187

Sakai, H., **On the significance of effective humidity in cold districts. (On dryness of a chip of wood, 6th Report.)** *Journal of Meteorological Research*, Tokyo, 4(5):216–222, Aug. **1952.** 2 figs., 6 refs. In Japanese; English summary p. (15)–(16). **MH-BH**—This is a combination of Reports 1–5 concerning the dryness of a chip of wood. Although the effective humidity that has a high correlation to moisture contents of wood is effectively used for fire warning, it is not always to be used in such cold districts as Tohoku in winter. From the experiments on chips of wood placed in- and outdoors, and researches on the effects of such meteorological factors as temperature, vapor pressure, relative humidity, rainfall and sunshine, it follows that the effective humidity is an important factor for fire warning in the warm season, but not in the cold. *Subject Headings:* **1. Humidity variations 2. Fire weather.**—*Author's abstract.*

6.3–207 551.571.35

Sasaki, Y., **On the humidity dip accompanied by thunderstorm.** *Journal of Meteorological Research*, Tokyo, 4(10):803–806, Feb. **1953.** 4 figs., 2 tables. In Japanese; English summary p. 49. **MH-BH**—A sharp drop of relative humidity by 10% or more has been observed at Japanese stations with the approach of a thunderstorm followed by a recovery with onset of precipitation. Dew point and mixing ratio also decrease showing that origin of this air differs from that of air preceding the storm. *Subject Headings:* **1. Humidity variations 2. Thunderstorms 3. Japan.**—*C.E.P.B.*

6.3–208 551.571.36:551.586:612(53)

Newman, C. C., **Wet-bulb temperatures in Aden.** *Meteorological Magazine*, London, 83(988):312–313, Oct. **1954.** table. **DWB**—Referring to his note on high wet-bulb temperatures at Aden in June 1953 (*Meteorological Magazine*, 83(980):59–60, Feb. 1954) (*see* 5.7–131, July 1954, *MAB*), author compares frequencies for the "comfortable" month of June 1954. *Subject Headings:* **1. Humidity extremes 2. Aden.**—*C.E.P.B.*

6.3–209 551.571.4:551.481.1

Staley, Raymond Coffey and Gerhardt, J. R., **Certain micrometeorological studies of a small inland lake.** Texas. Univ. Electrical Engineering Research Laboratory, Contract NOrd 9195, [Unnumbered report], Oct. 31, **1952.** 14 p. 8 figs., 6 tables, 3 refs., eqs. Photostat of typescript (?). **DWB**—An attempt is made to describe, for a daytime stable at-

osphere, the vertical transfer of water vapor from and heat to the surface of a small inland exas lake. A mechanism of forced vertical motion caused by a 20 to 30 mph wind blowing er waves is used to explain cool moist parcels rising and mixing with a dry warm environment. mploying fluctuation data for water vapor and temperature, mathematical expressions are eveloped for the vertical distribution of water vapor and temperature for parcel and environent and numerical values for the amount of mixing at various elevations are calculated. *ubject Headings:* **1. Vertical moisture transport 2. Inland lakes 3. Wind effects 4. Texas. Texas. Univ. Electrical Engineering Research Lab. II. Contract NOrd 9195.**—*Authors' stract.*

6.3–210 551.571.4:551.576.1 551.524.4:551.576.1

Gifford, Frank, Jr., **On "Temperature and moisture gradients under low stratus clouds."** *merican Meteorological Society, Bulletin*, 34(5):222, May **1953.** Kraght, Peter E., **Reply.** *id.*, p. 222. **DWB**—A criticism of KRAGHT, PETER E., **Temperature and moisture gradients der low stratus cloud** (*see item* 5.3–235, March 1954, *MAB*) in which he concludes that the uilibrium lapse-rate of temperature below stratus clouds in only 80% of the dry adiabatic pse rate. The author finds that contrary to KRAGHT's reasoning temperature dew point read is significantly correlated with ceiling height; possible reasons for this discrepancy are oposed. *Subject Headings:* **1. Stratus clouds 2. Dew point lapse rates 3. Vertical temrature gradient.**—*I.L.D.*

6.3–211 551.571.7 551.524.7

Saha, N. K. (*Univ. of Delhi*), **Distribution of water vapour in the atmosphere over Agra.** *ational Institute of Sciences of India, Proceedings*, Delhi, 14(5):249–262, May/June **1948.** tables, 6 figs., refs. p. 262, 19 eqs. Abstracted from reprint. **DWB**—Vertical distribution temperature and lapse rate is shown up to 23 km and of water vapor pressure and relative midity up to 10 km height. The vapor pressure distribution can be described by an exnential formula with temperature as the argument. A theoretical explanation of the formula made. *Subject Headings:* **1. Vertical water vapor distribution 2. Vertical temperature stribution 3. Agra, India.**—*A.A.*

EVAPORATION AND EVAPOTRANSPIRATION

6.3–212 551.573

American Geophysical Union. Committee on Evaporation and Transpiration, **Report the Committee, 1952/1953.** A. R. Croft, Chairman. *American Geophysical Union, ansactions*, 35(1):164–167, Feb. **1954.** 3 tables. **MH-BH**—MATHER tells about attempts Seabrook, N. J., to compare measured evapotranspiration with that calculated from Thornwaite's formula. He says the formula gives too low estimates in cold periods and too high ring warm periods. A list of location and length of record of 19 evapotranspirometers in e U. S., Canada, Mexico, Nigeria, Ireland, Hong Kong and Trinidad, and of proposed stallations in Argentina, Japan, Israel and Honduras and of tasks which could be considered above type comparisons (in Sudan, Calif., and Florida) is given. Results of work done in ld evapotranspiration experiments at Upper Darby, Penna.; Los Angeles; Ogden, Utah; heville and Durham, N. C., and Union, S. C., are briefly reviewed. *Subject Headings:* **Evapotranspiration formula accuracy 2. AGU. Committee on Evaporation and Tranration. I. Mather, J. R. II. Bethlamy, Nedavia III. Blaney, Harry F. IV. Marston, B. V. Hoover, Marvin D. VI. Kramer, Paul J. VII. Croft, A. R.**—*M.R.*

6.3–213 551.573

†Budyko, M. I., **Influenţa masurilor de amelioratie asupra capacităţii de evaporare.** nfluence of amelioration measures upon evaporation.] *Analele Romano-Sovietice, Seria ologie-Geografie*, 7(10):57–79, July/Aug. **1952.** 8 figs., 28 refs., 7 eqs. Translation of ginal Russian article (*see* 3.6–130, June 1952, *MAB*) into Romanian with reproduction of ures and bibliography. **DLC**—*Subject Headings:* **1. Evaporation 2. Potential evapoinspiration 3. Shelter belt effects 4. Translations 5. Romanian language.**—*M.R.*

6.3–214 551.573:631.4

Bystrov, A. A., **K voprosu ispytaniia uskorennykh metodov sushki pochvy pri polevom opredelenii ee vlazhnosti.** [Testing rapid methods of soil drying by field determination of it humidity.] *Meteorologiia i Gidrologiia*, No. 7:31–32, **1952. DLC**—Experimental testing wa made during 1948–1950 at Sinel'nikovo Agrometeorological Station. It was found that a temperatures 100–105°C the drying of soil takes 8 hours; for temperature 120–125°C, 6 hour and for temperatures 150–155°C, 4 hours. The increase of losses of organic substances a higher drying temperatures is very insignificant only some hundredths of one percent. *Subjec Headings:* **1. Soil drying 2. Soil moisture loss.**—*N.T.Z.*

6.3–215 551.573:533.1

Callaghan, Edmund E. (*Lewis Flight Propulsion Lab., Cleveland*), **Analogy between mas and heat transfer with turbulent flow.** *U. S. NACA, Technical Note*, 3045, October 1953 **DWB**—An analysis of combined heat and mass transfer from a flat plate has been made i terms of PRANDTL's simplified physical concept of the turbulent boundary layer. The result of the analysis show that for conditions of reasonably small heat and mass transfer, the rati of the mass- and heat-transfer coefficients is dependent on the Reynolds number of the bound ary layer, the Prandtl number of the medium of diffusion, and the Schmidt number of th diffusing fluid in the medium of diffusion. For the particular case of water evaporating int air, the ratio of mass-transfer coefficient to heat-transfer coefficient is found to be slightl greater than unity. *Subject Headings:* **1. Boundary layer theory 2. Evaporation theor 3. Heat transfer.**—*U. S. NACA abstract.*

6.3–216 551.573:631.

Chapman, L. J. and Linton, G. M., **Summary report on controlled irrigation at the Oron Nursery.** *Johns Hopkins Univ. Lab. of Climatology, Publications in Climatology*, 7(1):94–9 **1954.** fig., table. **DWB**—A constant water table in evapotranspiration tanks resulted i reduced growth and even death of red pine seedlings while watering from above was found t be adequate. A good agreement with Thornthwaite's formula was found in the latter cas Irrigation on the basis of a bookkeeping procedure was found most efficient when a soil moistur balance of 6–8 cm was maintained so that natural precipitation could be fully utilized. *Subje Headings:* **1. Evapotranspiration 2. Irrigation 3. Thornthwaite's formula.**—*A.A.*

6.3–217 551.573:551.57

*Croft, A. R. and Monninger, L. V. (*Intermountain Forest and Range Expr. Stat., U. Forest Service, Ogden, Utah*), **Evaporation and other water losses on some aspen forest type in relation to water available for stream flow.** *American Geophysical Union, Transaction* 34(4):563–574, Aug. **1953.** 4 figs., 10 tables, 7 refs. **MH-BH**—Study based on observatio made on experimental plots, discussing in detail precipitation, interception, evaporation fro snow, rainstorm runoff, summer evapotranspiration, field capacity, depletion-moisture conten soil moisture deficit, effect of root depths, etc. The water available for stream flow is con puted, depending on the vegetation cover. Overland and seepage runoff resulted in 30.4 for an aspen herbaceous cover. Removal of aspen trees resulted in a 4″ increase, witho seriously increasing soil erosion. The bare plot showed an additional increase of 4″ but a undesirable increase in surface runoff and soil loss was observed. *Subject Headings:* **1. Exper mental hydrology 2. Evapotranspiration 3. Soil erosion 4. Utah.**—*A.A.*

6.3–218 551.573:551.578.4

*Diamond, Marvin, **Evaporation or melt of snow cover.** *U. S. Snow, Ice and Permafro Research Establishment, Research Paper*, No. 6, Nov. **1953.** 6 p. 2 figs., 5 tables, 10 ref 2 eqs. **DWB**—Analyzing the heat balance of the snow surface, it was found that very litt evaporation can occur without melting. The evaporation potential decreases with higher a temperatures. A nomogram shows the conditions for condensation or evaporation from snow surface depending on air and snow temperature and relative humidity. *Subject Heading* **1. Snow melting 2. Evaporation of snow.**—*A.A.*

6.3–219 551.573:551.311.12

Finsterwalder, R., **Photogrammetry and glacier research with special reference to glacier retreat in the Eastern Alps.** *Journal of Glaciology*, 2(15):306–315, April 1954. fig., 24 refs., eqs. **Discussion** p. 312–315. **DWB**—Author describes methods of surveying glaciated areas and measurement of their decrease. In eastern Alps results show a decrease of surface area of 9–20%, average 17%, from 1920–1950, but this depends on slope and thickness. For several glaciers mean annual decrease of thickness was 0.61 m. Snow line in 2 glaciers rose by 90–92 m. Measurement of ice velocity and economy of glaciers are discussed. Glacier retreat was greatest in 1856–1890 and 1920–1950. *Subject Headings:* **1. Glacial ablation 2. Glaciers 3. Alps.**—*C.E.P.B.*

6.3–220 551.573(669)

*Garnier, B. J., **Measuring potential evapotranspiration in Nigeria.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(1):140–176, **1954.** 4 figs., 3 tables. **DWB**—A simplified evapotranspirometer, watered from above, was found superior to a tank with constant water level. Daily values of computed and measured potential evapotranspiration, precipitation and temperature are communicated for 5 places in Nigeria, as well as wet and dry bulb temperature and sunshine for University College at Ibadan. Evapotranspiration measurements were started in June 1951. The results show a fair agreement with Thornthwaite's formula, and an excellent correlation with saturation deficit. *Subject Headings:* **1. Potential evapotranspiration 2. Evapotranspiration data 3. Thornthwaite's formula 4. Ibadan, Nigeria 5. Nigeria.**—*A.A.*

6.3–221 551.573(756)

Gilbert, M. J., **Evapotranspiration measurements at Waynesville, North Carolina.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(1):52–54, **1954.** fig., table. **DWB**—Potential evapotranspiration was measured in a greatly simplified tank, applying irrigation whenever the moisture tension exceeded 100 cm. Daily losses averaged over irregular periods are communicated for one year. The annual total agrees quite well with Thornthwaite's computed values. *Subject Headings:* **1. Potential evapotranspiration 2. Evapotranspiration data 3. Thornthwaite's formula 4. Waynesville, North Carolina.** —*A.A.*

6.3–222 551.573(676)

*Grundy, G., **Some notes on evaporation from water and land surfaces.** *I.U.G.G. International Association of Scientific Hydrology, Brussels*, **1951,** [*Transactions*], 3:426–433. 2 figs., table, 3 refs. **DWB**—One year of observations from a 10 acre experimental catchment in Kenya revealed no surface or ground water runoff from an annual total of 38″ rainfall. Mean annual temperature was 62°F, relative humidity 83%. Variation of soil moisture is shown. Annual evaporation data from screened pans given for 6 stations. Author suggests the use of shallow rooted plants in arid zones in order to decrease evapotranspiration losses. *Subject Headings:* **1. Evaporation 2. Evapotranspiration 3. Kenya.**—*A.A.*

6.3–223 551.573:551.585(417)

*Guerrini, V. H., **A year of evapotranspiration in Ireland.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(1):98–111, **1954.** 2 figs., 4 tables, refs., append. p. 108–111. **DWB**—Daily values of computed and measured evapotranspiration (14 tanks), maximum and minimum temperature, sunshine, humidity and precipitation observed at Valentia are communicated for Aug. 1952 to July 1953. The agreement with Thornthwaite's formula is good for the vegetation period but poor for the winter months, when growing ceases (probably due to a lack of sunshine) despite relatively high temperatures. A similar disagreement was found between computed and measured runoff for two catchment areas. (*See also* 5.6–194, June 1954, *MAB.*) *Subject Headings:* **1. Potential evapotranspiration 2. Evapotranspiration data 3. Thornthwaite's formula 4. Runoff 5. Valentia, Ireland.** —*A.A.*

6.3–224 551.573 536.42

Hardy, J. K., **Evaporation of drops of liquid.** *Great Britain. Aeronautical Research Council, Reports and Memoranda*, No. 2805, **1953.** 9 p. 5 refs., 22 eqs. **GB-MO**—A mathematical analysis of the processes which follow when liquid is sprayed into air at a different temperature leads to equations from which the temperature taken up by a drop, or the rate at which it will evaporate, can be calculated. Conditions leading to icing are considered. *Subject Heading:* **1. Evaporation theory.**—*C.E.P.B.*

CONDENSATION

See also: **Clouds, precip. & thunderstorm elec.** (Shishkin), 6.3–1; **Cloud physics** (Cunningham, Atlas), 6.3-37; **Drop size distrib. instruments** (Bigg, Abel), 6.3–59; **Nucleation kinetics** (Carnegie Inst. of Technology), 6.3–203; **Supersaturation** (Sander, Damköhler), 6.3–204; **Supercooled clouds** (Pettit), 6.3–252; **Precip. formation** (Byers, others), 6.3–256.

6.3–225 551.574

Demiańczuk, P. P., **Termodynamiczne uzasadnienie wzoru empirysznego na wyznaczenie wysokości punktu kondesacji ponad poziom wyjśćia.** [The thermodynamic basis of the empirical formula for determining the height of condensation point above the exit level.] *Poland. Państwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomości Służhby Hydrologicznej i Meteorologicznej*, 3(2):148–150, **1951.** table, 18 eqs. **DWB**—Author shows how to derive the empirical equation $z-z_0 \approx A(T_0-\tau_0)$ for the condensation height from the laws of thermodynamics, utilizing the Clausius-Clapeyron equation for the saturated pressure of water vapor. z—height; z_0—height of exit level; T_0 and τ_0 temperature and dew point at z_0. Values for A versus τ_0 given for the causes of condensation and sublimation. *Subject Heading:* **1. Condensation level.**—*A.A.*

6.3–226 551.574

Gregorig, Romano (*Zurich, Switzerland*), **Hautkondensation an feingewellten Oberflächen bei Berücksichtigung der Oberflächenspannungen.** [Film condensation on surfaces with fine waves with consideration of surface tension.] *Zeitschrift für angewandte Mathematik und Physik*, 5(1):36–49, Jan. 15, **1954.** 12 figs., foot-refs., 16 eqs. In German; English summary p. 49. **DLC**—One has to distinguish between drop and film condensation. The latter is less efficient for the exchange of heat, but uneven surfaces increase the pressure differences up to several orders of magnitude due to different curvatures of the surface of the condensate. The theory of this phenomenon is outlined for the liminar case and extended also to turbulent flow. The remaining discussion is devoted to an industrial application (condensation pipes in heat exchange equipment). *Subject Headings:* **1. Condensation 2. Surface tension.**—*A.A.*

6.3–227 551.574.1:551.521.3

†Baxter, D. C., **Review of radiation scattering methods for measuring cloud droplet size.** *National Research Council of Canada, Report*, No. MD-40, April **1954.** 28 p. 7 figs., 43 refs., 10 eqs. **DWB**—The fundamental aspects of radiation scattering from spherical particles are reviewed and used as a background for the study of various systems for the measurement of particle size in natural clouds, a parameter of interest in cloud physics and aircraft icing work. Corona, rainbow and polarization methods are discussed but are considered hardly suitable. Radar scattering methods have certain advantages and are undergoing extensive development elsewhere, but the equipment is costly and analysis complex. A light transmission method can be used to give median volume size if combined with a liquid water content meter and if allowance is made for size spectrum. The photographing of the droplets in situ yields mean size and spectrum and could be further pursued, but recognition is needed of the basic problems to be overcome. *Subject Headings:* **1. Cloud droplet size measurement techniques 2. Scattering of radiation.**—*Author's abstract.*

6.3–228 551.574.1:551.578.11

Blanchard, Duncan C., **A simple method for the production of homogeneous water drops down to 1 micron radius.** Woods Hole, Oceanographic Institution, Contract Nonr-798(00)

(NR-085-011), Technical Report No. 8, May 1954. 62 p. 3 figs., 10 refs. **DWB**—A simple method for the production of homogeneous water drops down to 2 microns diameter is described. When bubbles of a given size burst at an air-water interface the collapse of the bubble cavity produces an upward moving jet which quickly disintegrates into several small drops. Each of these drops, not necessarily all the same size, rises to a height which is remarkably constant from one bubble to the next. The drop size at each of these heights was found to be equally constant. Photographs are shown of the drops produced and their remarkable uniformity in size. The size of the drops is controlled by the bubble size, the larger bubbles producing the largest drops. *Subject Headings:* **1. Drop size distribution 2. Drop shattering 3. Drop size photography. I. Woods Hole Oceanographic Institution II. Contract Nonr-798(00) (NR-085-011).**—*Author's abstract.*

6.3–229 551.574.1

Boucher, Roland J., **Empirical relationship between radar reflectivity drop size distribution and liquid water content in clouds.** Mount Washington Observatory, Contract AF 19(122)-399, June 30, **1952.** 14 p. 4 figs., 3 tables, 6 refs. **DWB**—A cloud droplet impinger, developed by the staff of the Mount Washington Observatory is described. Cloud samples obtained on the summit of Mt. Washington, N. H., with this instrument are analyzed and the results compared with simultaneous multicylinder observations. Values of radar reflectivity, Z, computed from the Mount Washington impinger observations and from aircraft observations in Germany by DIEM (1948) are correlated with the median volume diameter, d_0, and the liquid water content, W, obtained from the same observations. For any given value of d_0, it is found that Z increases approximately linearly with increasing W. The regression of log W on log Z results in the equation:

$$Z = 0.0370\ W^2.$$

Subject Headings: **1. Radar analysis of drops 2. Water content of clouds 3. Cloud droplet impinger. I. Contract AF 19(122)-399 II. Mount Washington Observatory, Gorham, N. H.** —*Author's abstract.*

6.3–230 551.574.1:551.578.4(99)

Burdecki, F., **The formation and the physical properties of snow and ice with particular reference to Antarctic conditions.** *South Africa. Weather Bureau, Notos,* 3(2):112–121, **1954.** 11 tables, 45 refs. **DWB**—The problem of the formation of ice crystals in the atmosphere, especially in the air-masses over Antarctic regions, is discussed. The weather elements, including solar radiation, influencing the ice formation in the atmosphere are considered. Afterwards the physical properties of snow and ice are discussed and it is pointed out that there exist great differences in the properties of ice, formed under natural conditions as sea-ice or land-ice in Antarctic regions, and ice artificially produced in laboratories. The heat-storage capacity of the Antarctic shelf-ice is investigated and it has been found that the firn of the Ross-Shelf-Ice (Little America III) has an extremely small value of the heat-storage capacity, nearly the same as fresh fallen snow and even considerably less than the sand of a desert. *Subject Headings:* **1. Ice crystal formation 2. Ice heat conductivity 3. Snow properties 4. Ice formation 5. Antarctica.**—*Author's abstract.*

6.3–231 551.574.1:551.576.1

Fritz, Sigmund; Neiburger, Morris; aufm Kampe, H. J. and Weickmann, H. K., **Small drops, liquid-water content, and transmission in clouds.** *Journal of Meteorology,* 11(5):428–430, Oct. **1954.** 9 refs., 4 eqs. **DWB**—Referring to previous correspondence (*see item* 5.3–312, March 1954, *MAB*) about TRABERT's formula, FRITZ discusses uncertainty of liquid-water content estimations and suggests a method of determining presence of small drops in clouds. NEIBURGER agrees that liquid-water content should be measured directly, AUFM KAMPE and WEICKMANN consider that droplets below 1μ radius do not occur. *Subject Heading:* **1. Water content of clouds.**—*C.E.P.B.*

6.3–232 551.574.1

Hosler, C. L., **Factors governing the temperature of ice-crystal formation in clouds.** In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the**

Toronto Meteorological Conference, Sept. 9–15, 1953. pub. 1954. p. 253–261. 7 figs., table, 4 refs. **DWB**—Experiments are described for determining freezing point of water in capillaries, captive droplets and cloud chambers. In distilled water freezing point depended only on drop radius, mean increasing from $-30°C$ at 25μ to $-23°$ at 55μ and to $-19°$ at 205μ. Effect of various substances as condensation nuclei is tabulated. One group has little effect in small concentration but depresses freezing point in high concentration; another group raises freezing point. In a cloud chamber, size of nuclei and resulting concentration of droplets formed on them affect freezing point. Results are attributed to role of interface between water and its surroundings in determining internal structure of the water mass. *Subject Heading:* **1. Freezing nuclei.**—*C.E.P.B.*

6.3–233 551.574.1

Lodge, James P. and Baer, Ferdinand, **An experimental investigation of the shatter of salt particles on crystallization.** *Journal of Meteorology*, 11(5):420–421, Oct. **1954.** table, 4 refs. **DWB**—The millepore analytical apparatus was used to test the theory of H. DESSENS (1946) on shattering of salt nuclei by drying. No such shattering was observed. *Subject Headings:* **1. Saline nuclei. I. Dessens, H.**—*C.E.P.B.*

6.3–234 551.574.1(261)

Moore, D. J. and Mason, B. J., **The concentration, size distribution and production rate of large salt nuclei over the oceans.** *Royal Meteorological Society, Quarterly Journal*, 80(346): 583–590, Oct. **1954.** 2 figs., table, 12 refs., 6 eqs. **DWB**—Size distributions of nuclei with salt content $>2\times10^{-14}$ g, measured on N. Atlantic Weather Ships, are divided into 2 types: I, formed by breaking waves with wind >7 m/s as residue of spray, 40/cm²/sec at 15 m/s varying with wind speed; II, with winds <7 m/s. Production of large nuclei by breaking waves in a wind tunnel greatest with winds 10–18 m/s. Rate of nucleus production over sea is estimated for each type. The mechanism of production was studied in the laboratory; large drops are formed by breaking up of jet formed by water entering cavity left by bubble, small drops from film of bubble. *Subject Heading:* **1. Saline nuclei.**—*C.E.P.B.*

6.3–235 551.574.1:551.584.61

Nolan, Patrick J., **The disappearance of condensation nuclei in a sealed room. Remarks on a paper by Smith and Schilling.** *Journal of Atmospheric and Terrestrial Physics*, 5(5–6): 345–346, Nov. **1954.** 2 tables, 3 refs., 3 eqs. **DWB**—Data of L. G. SMITH and G. F. SCHILLING (ref. wrongly quoted) can be represented by $dZ/dt = -\gamma z^2 - \lambda z$, where γz^2 is loss by coagulation and λZ by diffusion and sedimentation. From data $\lambda = 5.12\times10^{-6}$ sec^{-1} and $\gamma = 2.56\times10^{-9}$ cm^1 sec^{-3}, in good agreement with theoretical values. *Subject Headings:* **1. Condensation nuclei 2. Indoor effects.**—*C.E.P.B.*

6.3–236 551.574.1

Schaefer, Vincent J., **Silver and lead iodides as ice-crystal nuclei.** *Journal of Meteorology*, 11(5):417–419, Oct. **1954.** 3 figs., 5 refs. **DWB**—Cloud chamber comparisons showed that both iodides are equally effective as sublimation nuclei below $-5°C$. As condensation nuclei at $+5°C$ both were effective, but droplets formed on silver iodide froze at $-5°C$, those on lead iodide not till $-20°C$. Difference is attributed to much lower solubility of AgI. *Subject Headings:* **1. Condensation nuclei 2. Freezing nuclei.**—*C.E.P.B.*

FOG

6.3–237 551.575.1:551.509.34(748)

*Hyman, Harry, **Causes and forecasting of fog at Philadelphia International Airport.** Philadelphia, Pa., **1949.** 22 p. map, tables, 11 refs. Mimeo. **DWB**—Fogs that occurred at the airport during 1947 are classified and statistical data presented in simple tables and discussed. Restriction of visibility through smoke is accounted for. Pre-warm frontal and post-cold frontal fogs, frontal, maritime, radiation, sea fog, river steam fog and no fog situations are discussed. Tables give frequency by type and month. Map of region shows sources of pollution and topographical influence. *Subject Headings:* **1. Fog classification 2. Fog frequencies 3. Fog forecasting 4. Philadelphia, Pa.**—*M.R.*

6.3–238 551.575.1(04)

Nelson, Robert T., **Weather or not, fog.** *Better Farming*, Chicago, Autumn 1951, p. 6. **DWB**—The formation of ground fog, advection fog and sea smoke is explained in a popular manner. *Subject Headings:* **1. Fog formation 2. Popular meteorology.**—*G.T.*

6.3–239 551.575.1:551.578.46

Remarkable temperature variations and fog formation over snow at Stornoway, February 8, 1954. *Meteorological Magazine*, London, 83(989):344–347, Nov. 1954. 2 tables, 2 refs. **DWB**—At 15 h a turning plane threw snow up to 40–50 ft. As the snow settled fog formed and spread rapidly to a depth of 13–35 ft with a screen minimum of 13.9°F, though snow on roofs at 10 ft was melting. The fog is attributed to propeller mixing cold surface air with warm air above, and perhaps cooling of the warm air by snow thrown into it. *Subject Headings:* **1. Fog formation 2. Snow cover effects 3. Stornoway, England.**—*C.E.P.B.*

6.3–240 551.575.1

Richardson, E. G., **Physical properties of fog.** *Research*, London, 7(4):152–155, April 1954. 5 figs., 7 refs. **DLC**—Following physical properties of fog are discussed: mass content and drop size and the transmission of light and sound through fog. Their various methods of investigation are described. *Subject Headings:* **1. Fog structure 2. Fog drop size 3. Fog transmission.**—*I.L.D.*

6.3–241 551.575.1:551.571

*Robinson, Elmer; Wiggins, Ernest J.; Thuman, William C.; MacLeod, James A. and Gates, Robert W., **Field observations and methods relating to ice fog at Eielson Air Force Base, Alaska, Dec. 1952–Feb. 1953.** Stanford Research Institute, Contract AF 19(122)-634, SRI Project CU-473, Scientific Report, No. 4, Report No. 13, Feb. 16, 1954. 99 p. 10 figs., numerous tables, 11 refs. **DWB**—Studies of ice fog were conducted at Eielson Air Force Base, Alaska, during the 1952–53 winter. Meteorological observations included continuous records of temperatures, winds, low-level lapse rates, and net radiation, as well as periodic wiresonde observations and humidity determinations. The field program is presented and the instrumental techniques described in detail. The data collected during the period are given in tabular form and include contingency tabulations of the recorded data. (*See also* 5.2–200, Feb. 1954, *MAB*.) *Subject Headings:* **1. Ice fog 2. Observational data 3. Humidity measurements 4. Alaska. I. Stanford Research Institute II. Contract AF 19(122)-634.**—*Authors' abstract.*

6.3–242 551.575.1

Rodewald, Martin, **Nebel vor der Nordwestecke Spaniens.** [Fog off north-west Spain.] *Wetterlotse*, No. 74:162–166, Aug. 1954. 3 figs. **DWB**—Fog is especially frequent in summer, when the Azores high, advancing northwards, brings N.E. winds which cause upwelling of cold water (map of sea temperature in July). The wind off the land is warm and dry, and takes some time to become saturated, so that fog does not form over the coldest water but further off-shore often in streaks. In April–May 1954 the N.E. winds set in early and fog caused a collision. *Subject Headings:* **1. Fog formation 2. Spanish Coast.**—*C.E.P.B.*

6.3–243 551.575.3(42)

Lawrence, E. N., **London's fogs of the past.** *Weather*, 8(12):367–369, Dec. 1953. **MH-BH**—Quotations from DICKENS, LUTTRELL, SWIFT and SIMOND, describing old London smog. *Subject Headings:* **1. Smog 2. London, England.**—*C.E.P.B.*

6.3–244 551.575.36(43)

*Bintig, Paul and Markgraf, Hans, **Die Nebelverhältnisse im Küstengebiet der Weser- und Emsmündung.** [Fog conditions of the coastal area of the mouths of the Weser and Ems Rivers.] *Hamburg. Seewetteramt, Einzelveröffentlichungen*, No. 3, 1954. 6 p. 10 figs., 10 tables. Price: DM 2,00. Also in: *Wetterlotse*, 71:97–103, May 1954. **DWB**—In a previous paper (*see* 5.11–149, Nov. 1954, *MAB*) the fog frequency for stations in the Elbe estuary was analyzed. This paper gives a similar analysis of data for a dozen stations at the

mouth of the Weser and Ems, and on offshore islands, based on up to 10 years of record (1937–52 with breaks). *Subject Headings:* **1. Fog frequencies 2. Fog data 3. Northwest German coast.**—*M.R.*

CLOUDS

See also: **Cloud phase charts** (Appleman), 6.3–32; **Cloud physics** (Cunningham, Atlas), 6.3–37; **Cloud obs.** (Schüepp), 6.3–44; **Cloud forecasting** (French, Johannessen), 6.3–75; **Cloud obs.** (Bundgaard), 6.3–153; **Temp. & moisture gradient** (Gifford), 6.3–210; **Water content of clouds** (Fritz, others), 6.3–231.

6.3–245 551.576.1

Airborne invaders forecast weather. *All Hands*, Washington, D. C., No. 446:30–35, April **1954.** diagrs., photos. p. 32–33, Cloud forms and symbols for the navyman. **DWB**—Popular treatise on clouds, cloud formation, cloud types, frontal clouds and tornadoes for instructing the ordinary seaman in the U. S. Navy as to their identification and importance. Cleverly and well illustrated. *Subject Heading:* **1. Cloud types.**—*M.R.*

6.3–246 551.576.1

Bancroft, F. M., **An unusually clear example of lenticular clouds.** *Meteorological Magazine*, London, 83(980):57, Feb. **1954.** 4 photos. **MH-BH**—Four photos of lenticular altocumulus over N. Ireland Nov. 29, 1953, with brief description. *Subject Headings:* **1. Lenticular clouds 2. Northern Ireland.**—*C.E.P.B.*

6.3–247 551.576.1:551.551

Kraus, E. B., **Flying saucer?** *Weather* 9(11):356, Nov. **1954.** photo. **DWB**—Photo in Snowy Mts., New South Wales, May 31, 1953, during passage of a cold front showed a saucer-shaped cloud over an enclosed basin. It is attributed to inflowing cold air forcing up pre-frontal air in a vortex. *Subject Headings:* **1. Cloud vortices 2. Snowy mountains, New South Wales.**—*C.E.P.B.*

6.3–248 551.576.1:551.515.8

Line of clouds off Nova Scotia. *Marine Observer*, 24(165):140–141, July **1954.** photo. **MH-BH**—Fine photograph of a line of cloud hummocks on July 1, 1953. Height 800–1000 ft. Probably last remains of a line-squall cloud. *Subject Headings:* **1. Line squall cloud 2. Nova Scotia, Canada.**—*C.E.P.B.*

6.3–249 551.576.1:551.515.8

MacDowall, J., **Line squall off Bournemouth.** *Weather*, 9(8):253, Aug. **1954.** photo. **DWB**—Photo of a line-squall cloud on May 27, 1954. *Subject Headings:* **1. Squall clouds 2. Bournemouth, England.**—*C.E.P.B.*

6.3–250 551.576.1:551.551

Revolving cloud. Atlantic Ocean (off Casablanca). *Marine Observer*, 24(165):140, July **1954.** sketch. **MH-BH**—Two fractonimbus clouds (about 1000 ft) in a strong wind were observed rotating about a horizontal axis, rising at the front and descending at the rear. *Subject Headings:* **1. Revolving cloud 2. Atlantic Ocean.**—*C.E.P.B.*

6.3–251 551.576.11

Costin, F. A., **An observation of wave cloud.** *Weather*, 9(7):201–202, July **1954.** fig., 2 tables. **MH-BH**—Account of very regular wave cloud near Chester on Nov. 20, 1953, seen from airplane. Wave length 7720–5500 ft, crests at 3960 ft, troughs at 3270 ft. There was an inversion of 10°F between 3470 and 4050 ft. Underside of cloud was flat. *Subject Headings:* **1. Cloud systems 2. Chester, England.**—*C.E.P.B.*

6.3–252 551.576.11:551.574.7

*Pettit, K. G., **The characteristics of supercooled clouds during Canadian icing experiments, 1950–53.** (In: American Meteorological Society and Royal Meteorological Society,

Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953. pub. 1954. p. 269–275. 10 figs., 5 tables, 13 refs.) **DWB**—Aircraft measurements in supercooled cumuliform and stratiform cloud in icing conditions gave frequencies of liquid water content (maximum and average) and temperatures, horizontal extent and droplet median volume diameter. Results are shown in tables and curves. *Subject Heading:* **1. Icing in clouds.**—*C.E.P.B.*

6.3–253 551.576.11

Poulter, R. M., **Cloud sequence over Cyprus.** *Weather*, 9(11):351, Nov. 1954. fig., photos., table. **DWB**—Photos from Nicosia on June 26, 1953, show a trace of orographic Cu at 9 h building up to a towering CuNb by 12 h and breaking up by 14 h. Tephigram is shown. *Subject Headings:* **1. Cumulus cloud formation 2. Cyprus.**—*C.E.P.B.*

6.3–254 551.576.11:629.13

Poulter, R. M., **Contrails and distrails.** *Meteorological Magazine*, London, 83(988):314, Oct. 1954. fig. **DWB**—Shadow of a contrail on a cirrus sheet below it may be mistaken for a distrail. *Subject Heading:* **1. Condensation trails.**—*C.E.P.B.*

PRECIPITATION

See also: **Precip. normals** (Peguy), 6.3–48; **Rainfall data** (Sudan. Met. Serv.), 6.3–49; **Cloud meters** (Rudman, Bigg), 6.3–60; **Catchment basins** (Pirnia), 6.3–275; **Maximum runoff** (Potter), 6.3–276; **Forest rainfall** (Howell), 6.3–339.

6.3–255 551.577:523.74

Grappe, R., **Comparaison des longues séries de précipitations à Paris et Marseille et leur relation avec l'activité solaire.** [Comparison between long precipitation series in Paris and Marseille and their relation to solar activity.] *La Météorologie*, 4th Ser., No. 32:293–300, Oct./Dec. 1953. fig., 2 tables. French, English and Spanish summaries p. 293. Also: Douchy, P., **Quelques remarques relatives à la validité de la méthode statistique utilisée pour la comparaison des longues series de precipitations à Paris et à Marseille.** [Some remarks on the validity of the statistical method used for the comparison of the long precipitation series in Paris and Marseille.] *Ibid.*, p. 303–304. **MH-BH**—Using long period records at Paris (1800–1952) and 30-year running means, a periodicity of 80–85 years (corresponding to CLAYTON's 80-year solar cycle) was obtained with a maximum in 1845 and 1930, and a minimum around 1888. This breaks down into 45 rainy years (1816–60), 44 dry years (1861–1904) and 40 more predominantly rainy years (1905–44). The magnitude of the anomalies during these 3 periods were: +38 mm (62%), −32 mm (70%) and +46 mm (67%). The Marseille records do not show so clearly a periodicity over the period 1840–1952, nor is it so evident in temperature records for Paris. Other solar cycles (11-year, ecc.) than the 80-year cycle of CLAYTON, do not correlate very highly with general circulation anomalies. *Subject Headings:* **1. Precipitation cycles 2. Long period records 3. Solar cycle 4. Paris, France 5. Marseille, France.**—*M.R.*

6.3–256 551.577.1:551.574.1

Byers, Horace R.; Battan, Louis J. and Braham, Roscoe R., Jr., **Observations and measurements on natural and artificial rain from convective clouds.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 262–268. 5 figs., 2 tables, 9 refs.) **DWB**—Radar measurements show that in Ohio and Illinois (humid) precipitation is initiated at temperatures above ice-phase. In arid New Mexico echoes came only from cloud tops below −12°C and mostly below −24°C. If artificial nucleation requires supercooling, suitable clouds are rare in eastern U. S. Size distribution of sodium chloride particles was measured in Illinois, showing less than $1/m^3$ outsize nuclei ($>60\mu$) so that giant sea salt nuclei cannot initiate precipitation in warm clouds. *Subject Heading:* **1. Precipitation formation.**—*C.E.P.B.*

6.3–257 551.577.11

Rigby, E. Caroline; Marshall, J. S. and Hitschfeld, Walter, **The development of the size distribution of raindrops during their fall.** *Journal of Meteorology*, 11(5):362–372, Oct. 1954. 15 figs., 15 refs., 14 eqs. **DWB**—Distribution during fall is inferred from observed distribution at ground, in steady rain and showers. Changes due to collisions, accretion of cloud and evaporation of drops are examined quantitatively; none basically alter form of distribution. Development, descent and vertical expansion of radar Z during a shower are computed and shown for times 0, 300 and 600 sec. and compared with observed rate of descent of radar echoes from showers. An appendix by K. L. S. Gunn discusses depletion of cloud through accretion by falling rain. *Subject Headings:* **1. Precipitation mechanism 2. Raindrop size distribution. I. Gunn, K. L. S.**—*C.E.P.B.*

6.3–258 551.577.2(675)

*Institut National pour l'Étude Agronomique du Congo Belge, Brussels, **Chutes de pluie au Congo Belge et au Ruanda-Urundi pendant la décade 1940–1949.** [Rainfall in the Belgian Congo and in Ruanda-Urundi, during the decade 1940–1949.] *Institut National pour l'Étude Agronomique du Congo Belge, Brussels, Bureau Climatologique, Communication*, No. 3, **1951.** 248 p. mostly tables. "Monthly annual statistics (1927–1939) formerly published regularly in the **Bulletin Agricole du Congo Belge.**" **DWB**—A great quantity of monthly and annual rainfall data for 1940–1949 (total precipitation, maximum daily precipitation in month and number of days with precipitation) arranged according to 7 provinces: Leopoldville, Equateur, Orientale, Kivu, Katanga, Kasai and Ruanda-Urundi with about 60 stations in each province—nearly 500 stations in all. Many stations do not have data for the entire 10-year period. *Subject Headings:* **1. Rainfall data 2. Belgian Congo 3. Ruanda-Urundi.**—*M.R.*

6.3–259 551.577.34(94):551.557.3

Kraus, E. B., **Secular changes in the rainfall regime of SE. Australia.** *Royal Meteorological Society, Quarterly Journal*, 80(346):591–601, Oct. 1954. 5 figs., 7 tables, 3 refs. **DWB**—Thirty-year running averages at stations in Victoria and New South Wales show: from beginning of record (1870) to about 1893 increasing winter and decreasing summer rain and a rapid decrease in spring and fall. After 1893, decrease in winter and increase in summer, and a long drought in spring and fall followed by a rise. Individual years indicate a discontinuity after 1893. Winter rainfall is positively and summer negatively correlated with strength of W winds at 300 mb; a maximum W flow inhibits rain-bearing east coast cyclones in spring and fall. The changes are therefore attributed to increase of upper W winds followed by a decrease. *Subject Headings:* **1. Precipitation trends 2. Upper air wind variations 3. Australia.**—*C.E.P.B.*

6.3–260 551.577.36(676/8)

Glover, J.; Robinson, P. and Henderson, J. P., **Provisional maps of the reliability of annual rainfall in East Africa.** *Royal Meteorological Society, Quarterly Journal*, 80(346):602–609, Oct. 1954. 3 figs., 9 refs. **DWB**—Sources of rainfall of Kenya, Uganda and Tanganyika and causes of variability are described. The frequency distribution of annual totals is normal and mean and standard deviation are used to calculate maps of probability of annual rainfall <20 and <30 inches; the latter indicates suitability for agriculture. Features of the maps and some applications are discussed. *Subject Headings:* **1. Rainfall probabilities 2. Rainfall charts 3. East Africa.**—*C.E.P.B.*

6.3–261 551.577.36

Thomson, A. B., **One aspect of the pattern of rainfall.** *Meteorological Magazine*, London, 83(988):293–297, Oct. **1954.** 2 figs., 4 tables, 2 refs. **DWB**—Long period average rates of rainfall over British Isles are nearly constant at 0.47 in./hr. Writing N = tabulated hours with r or more mm/hr. and R total rainfall, monthly values of R/N for various values of r are represented by $\log (R/N) = 1.063/r - 0.536$. At Poona, India, $\log (R/N) = 0.57/r + 0.02$. *Subject Heading:* **1. Precipitation rate.**—*C.E.P.B.*

SNOW

See also: **Snow sampling instruments** (Fuchs), 6.3-61; **Heat balance of snow** (Gerdel), 6.3-120; **Radiation wind & temp. profiles** (Liljequist), 6.3-122; **Upward rain movement,** 6.3-193; **Evap. of snow** (Diamond), 6.3-218; **Drop size photography** (Blanchard), 6.3-228; **Snow & ice properties & formation** (Burdecki), 6.3-230; **Snow cover effects,** 6.3-239; **Snow melt runoff** (Pramanik), 6.3-277.

6.3-262 551.578.41:551.584.34

Ball, F. K., **Dirt polygons on snow.** *Weather*, 9(10):322-323, Oct. 1954. fig. **MH-BH**—Describes, with diagram, mechanism by which dirt initially uniformly distributed through snow is concentrated at the ridges of polygons as ablation proceeds. The process which causes a pattern of hollows during ablation of snow may be a flow pattern similar to that of water-eroded hollows in rocks. *Subject Heading:* **1. Snow cover effects.**—*C.E.P.B.*

6.3-263 551.578.41:551.584.34

Richardson, W. E., **Dirt Polygons.** *Weather*, 9(4):117-121, April 1954. 3 figs., 4 photos. **MH-BH**—Further description of small hollows 1-1½ in. deep in surface of small snowbeds 5-7 months old on Crossfell, with a clear capping of sooty dirt on the crests between them. Author favors a cellular convection theory in whole thickness of a thin snow bed, the upper surface being cold and the soil beneath warmed by conduction from neighboring bare ground. *Subject Heading:* **1. Snow cover effects.**—*C.E.P.B.*

6.3-264 551.578.46:551.596.9

Xántus, János, Jr., **Zúgó hó jelensége Kolozsvár környékén.** [The phenomenon of roaring snow near Kolozsvár.] *Időjárás*, 58(2):126-127, March/April 1954. **MH-BH**—The author witnessed the rare "roaring snow" phenomenon on Feb. 3, 1954 at an altitude of 480 m in a middle mountain area of Transylvania. According to Aujeszky (*Természettudományi Közlony*, Budapest, v. 74, 1942), the phenomenon occurs when snowfall takes place at very low temperature and strong wind and is followed by sudden warming of the air with low vapor content. Such situations lead to the compression of the snow masses into ice, the formation of caverns inside the ice (by melting and evaporation and by sublimation) and, finally, to the escape of air from the collapsing caverns. The author compares the sound produced by the escaping air to detonations of heavy anti-aircraft artillery or exploding mines. He gives a brief description of the weather development which preceded the occurrence, and of the snow profile. The writer observed 12 "detonations" within an hour. The observation was confirmed by other witnesses. *Subject Headings:* **1. Snow structure 2. Roaring snow.**—*G.T.*

6.3-265 551.578.46

*Grunow, Johannes, **Über die Bestimmung des Schneeanteils am Niederschlag.** [Determination of snow component of precipitation.] *Geofisica Pura e Applicata*, 27:167-173, 1954. 2 tables, 8 refs. German and English summaries p. 167. **MH-BH**—In calculating the snow (melted) portion of the annual precipitation, the "pure snow" portion is easy to calculate from daily measurements of water content in rain gages. But when snow and rain are mixed (25% of the total at 1000 m elevation in Germany), the part to attribute to snow vs. rain is variable—from month to month and place to place. Some authors have a 50-50 ratio and others have used various arbitrary systems as can be seen in the table. The best agreement with measurements of water content of snow cover is obtained by using rain gage readings for pure snow, and variable factors depending on the density of the new snow for the mixed cases or in transition months. This latter method, attributed to Obenland (1952), gives agreement within 2% and Steinhäusser's method gives somewhat poorer results. Where density measurements are not available, the 50-50 ratio is about as good as any, though an altitude-season factor improves it. *Subject Headings:* **1. Water content of snow 2. Snow density data.**—*M.R.*

6.3-266 551.578.46:551.573

Hubley, Richard C., **The problem of short period measurements of snow ablation.** *Journal of Glaciology*, 2(16):437-440, Oct. 1954. 5 refs., 4 eqs. English and German sum-

maries p. 437. **DWB**—Measurements of ablation by sinking of snow surface, ignoring density changes, may be inaccurate by 15–65%. Author recommends coring but regards more precise methods as essential. *Subject Heading:* **1. Ablation measurement.**—*C.E.P.B.*

6.3–267 551.578.46:624.18

Lauscher, F., **Methoden der Lawinenbekämpfung.** [Methods of avalanche prevention.] *Wetter und Leben*, 5(11/12):213–214, Dec. **1953. MH-BH**—A summary of a lecture delivered by N. Hassenteufel on 7.12.1953 at the Hoshschule für Bodenkultur in Vienna. The technical methods for preventing avalanches are classified into five types, namely: 1) preventing of breaking off of masses, 2) reducing the size of the avalanches, 3) detouring, 4) blocking and 5) discharging the snow masses. Each method is described briefly. *Subject Heading:* **1. Avalanche protection.**—*I.L.D.*

6.3–268 551.578.46

Matznetter, Jos., **Über die Lawinentätigkeit an der Arlbergbahn.** [Avalanches in Arlberg.] *Wetter und Leben*, 6(1/2):21–25, March **1954.** 4 refs. **DWB**—The immediate factor determining the avalanche occurrences in the Arlberg region and its western surroundings is attributed to the position on the windward side of the Alps, towards the northwest. The relationship between topography and normal snowfall, the individual unusual snowfalls and the role of erosion in the formation of avalanches are discussed. The paths of avalanches are denoted. The avalanche record from 1884/1885 up to the present is summarized. *Subject Headings:* **1. Avalanches 2. Arlberg, Austria.**—*I.L.D.*

6.3–269 551.578.46:551.579.2

*U. S. Corps of Engineers, **Clear weather snow-melt runoff in a densely forested area, Willamette Basin Snow Laboratory.** *U. S. Corps of Engineers, Snow Investigations Research Note*, No. 19, May 15, **1954.** 29 p. 6 tables, figs. (fold.), 13 refs. **DWB**—The interrelation between thermal budget components and temperature and humidity indices is pursued with statistical analyses of temperature-humidity-runoff relations in the Willamette Basin Snow Laboratory. Linear regression equations are derived for rain-free periods in the months of April and May by correlation of daily volumes of snow-melt runoff with air temperature and vapor pressure data from a single index station in the Mann Creek drainage area. Estimates of snow-melt runoff based on temperature and humidity are shown to be approximately 15 percent better that estimates based only on a temperature index. Correlation coefficients, standard errors of estimate, and coefficients of determination for each equation are presented. Estimates of daily runoff made with each equation are compared graphically with observed values. Derived coefficients are compared with thermal budget and Light's melt factors for convection and condensation. *Subject Headings:* **1. Temperature-humidity-runoff relations 2. Snow melt runoff.**—*From author's abstract.*

6.3–270 551.578.46:551.579.2

†*U. S. Corps of Engineers. **Snow-cover depletion and runoff.** *U. S. Corps of Engineers, Snow Investigations Research Note*, No. 16, Sept. 30, **1953.** 27 p.+appends. numerous tables, diagrs., append. 4, bibliog. **DWB**—Relations between depletion of snow cover during spring and resulting runoff are worked out quantitatively on the basis of observations made during 1947 in the Upper Columbia and Central Sierra Snow Laboratory Basins and for other years in those two basins and the Fraser and King River Basin. It was found that south facing slopes are about 20 days ahead of north slopes in reaching a given % of snow cover. Thus diversified terrain causes snow melt season to last twice as long as in homogeneous terrain. Snow cover shrinks slowly in area at first, then more and more rapidly. Relation between snow cover and future runoff improves as season advances and snow cover is depleted. Several methods of estimating snow cover extent are described and evaluated. Data are given in tables and working nomograms presented and their use described. *Subject Headings:* **1. Snow melt forecasts 2. Snow cover duration 3. Snow melt runoff 4. Upper Columbia Snow Laboratory, Montana 5. Central Sierra Snow Laboratory, Calif. I. Miller, David H.**—*M.R.*

6.3–271 551.578.46

White, Sidney E., **The firn field on the volcano Popocatepetl, Mexico,** *Journal of Glaciology,* 2(16):389–392, Oct. **1954.** 6 figs., 10 refs. English and German summaries p. 389. **DWB**—E through N to SW sides have permanent firn down to 4950 m in the E to 4573 m in the N. Small glaciers exist. Annual variation of precipitation, melting and evaporation is estimated. Firn field vanished during Climatic Optimum but existed in 1519. In 1906 a glacier extended to 4335 m. *Subject Headings:* **1. Firn 2. Popocatepetl, Mexico.**—*C.E.P.B.*

HYDROMETEOROLOGY

See also: **Soil moisture meas.** (Van Bavel, others), 6.3–33; **Evapotranspiration** (Croft, Monninger), 6.3–217; **Snow melt runoff** (U. S. Corps of Engr.), 6.3–269; **Snow cover runoff** (U. S. Corps of Engr.), 6.3–270; **Water regulating forest,** 6.3–341.

6.3–272 551.579:06

Austria. Hydrographisches Zentralbüro, **60-Jahrfeier in Wien.** [60th anniversary in Vienna.] Its *Metteilungsblatt des Hydrographischen Dienstes in Österreich,* No. 8, Oct. **1953.** 7 p. **DWB**—Several speeches and some historical accounts on the development of hydrology and the hydrographic service and network in Austria during the past ten years. *Subject Headings:* **1. Hydrologic services 2. Vienna, Austria.**—*M.R.*

6.3–273 551.579

Petrović, R., **Katastar voda.** [Hydrologic survey.] *Yugoslavia. Hidrometeorološka služba. Hydrometeorološki Glasnik,* 1(1):46–50, Aug., **1948.** In Serbian. **DWB**—The author discusses the form and the content of the surveys of water energy. These can be worked out as a general survey, or a survey of water supply, water transport, melioration, etc. The surveys must contain a description of the region and the observational points, and tables and graphs of hydrologic characteristics (annual and extreme variations of the level, runoff, pollution of water, ice conditions, etc.). *Subject Headings:* **1. Water supply survey 2. Yugoslavia.**—*N.T.Z.*

6.3–274 551.579:628.1(497.1)

*Petrović, R. **Katastar vodnih snaga sliva Zapadne Morave (Prikaz).** [Survey of water power resources in delta of western Moravia (Outline).] *Yugoslavia. Hidrometeorološka služba. Hidrometeorološki Glasnik,* 2(1/2):114–122, **1949.** fig., map, 4 tables. In Serbian. **DWB**—An analysis of the survey of regional, meteorological, hydrological, and geological characteristics carried out for Sweden, Austria and the U.S.S.R. Author presents a detailed review of water resources of western Moravia, with extensive data on runoff for many points on this river. Special attention is paid to low-power hydroelectric stations. *Subject Headings:* **1. Water resources 2. Runoff 3. Western Moravia 4. Yugoslavia.**—*N.T.Z.*

6.3–275 551.579:551.577.2(55)

Pirnia, H. **Experience in the integrated development of a river basin.** (In: United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, N. Y. 1949, **Proceedings,** v. 4, **Water resources,** p. 162–172, 1951.) **DWB**—Report on water conservation and utilization in Iran. The hydrological and meteorological observation and research work is still in an early development stage. An approximate annual rainfall map is given with watershed boundaries, a table with catchment areas and average rainfall in these, a list of rivers with maximum and minimum runoff and a summary of irrigation projects. *Subject Headings:* **1. Water resources 2. Catchment basins 3. Rainfall variations 4. Runoff 5. Irrigation 6. Iran.**—*A.A.*

6.3–276 551.579:551.577.37

*Potter, W. D. (*Dir. Section of Hydrology, Div. of Drainage & Water Control, U. S. Soil Conser. Ser.*), **Use of short-term runoff records in probability studies.** *I.U.G.G. International Association of Scientific Hydrology, Brussels,* **1951** [*Transactions*], 3:240–251. 3 figs., 3 tables, 11 refs. **DWB**—A method is developed for the adjustment to long-year periods of

probability curves for peak rates of runoff derived from short-term records. Data for rainfall intensity (60 and 120 minutes; 18 stations) and a map showing reduction factors are given for the Allegheny-Cumberland Plateau. *Subject Headings:* **1. Maximum runoff 2. Rainfall intensities 3. Allegheny-Cumberland Plateau, United States.**—*A.A.*

6.3–277 551.579:551.578.46

Pramanik, S. K. and Rao, K. N., **Contribution of snow to flood flow in Indian rivers.** *Irrigation and Power*, Simla, 10(1):102–103, Jan. **1953. DWB**—Snow melt is unimportant for floods in the Yamuna, Ganga, Indus and Punjab Rivers and possibly for other rivers springing from the Himalayas, except the Brahmaputra which requires further study. Snow melt does enter into the runoff from the rivers rising in the Himalayas in the months of March to June, although about half or more of the flow is due to rain. After June the heavier monsoon rains are predominant and snow melt less important. *Subject Headings:* **1. Snow melt runoff 2. Indian rivers 3. India.**—*M.R.*

6.3–278 551.579:06

Prötzel, Josef, **Zur Geschichte der Gewässerkunde in Bayern.** [History of hydrology in Bavaria.] (In: Bavaria. Landesstelle für Gewässerkunde, **Beiträge zur Gewässerkunde.** Munich, **1950.** p. 9–15.) **DLC**—National hydrographic bureaus or institutes were established in France in 1854, in Prague in 1875, in Baden in 1883, in Austria in 1893, in Switzerland in 1895 and in Bavaria in 1898. Further development of hydrological and later hydrometeorological networks and surveys is described, including work in the fields of runoff, ground water, flood reports and warnings and water pollution or purification, especially that in Bavaria. *Subject Headings:* **1. Hydrologic services 2. Hydrometeorological networks 3. Bavaria.**—*M.R.*

6.3–279 551.579

Quin's rainfall traps. *California Citrograph*, 37(2):76, Dec. **1951. DA**—Dr. Quin, manager of the world's biggest citrus estate, "Zebediela" in northern Transvaal (6000 acres of orange trees), has built dams in waste land to conserve flood water for restoring underground water and has permanent earth basins around each tree so no irrigation water runs away. He has also turned intermittent rivers into perennial rivers by damming flood waters. The estate has a department of ground water and a trained geologist as conservator of underground water. *Subject Headings:* **1. Water conservation 2. Zebediela, Transvaal. I. Quin, P. J.**—*M.R.*

6.3–280 551.579

Robaux, M. A., **Compte rendu sur l'activité hydrologique au Maroc.** [Summary of hydrological activity in Morocco.] *I.U.G.G. International Association of Scientific Hydrology, Brussels*, **1951,** [*Transactions*], 1:63–71, pub. **1952.** refs. **DWB**—Detailed reports on research activities in the fields of ground and surface water hydrology, arranged by natural regions. Information given on temperature conditions, evaporation, permeability, groundwater yield and floods. A table characterizes runoff for average dry and wet years, and a list of publications is given on pp. 69–70. *Subject Headings:* **1. Hydrologic research 2. Runoff 3. Morocco.**—*A.A.*

6.3–281 551.579

Roslonski, R., **Le bilan du circuit des eaux d'un bassin et la méthode de son calcul.** [The water balance of a catchment area and the method of its computation.] *I.U.G.G. International Association of Scientific Hydrology,* [*Transactions*] Oslo, **1948,** 1:83–97. 8 figs. tables, refs., 4 eqs. **DWB**—An elaborate analysis of the hydrologic cycle, emphasizing mainly the retention of water under the earth's surface from year to year, considering the ground level variations. Water balance data given for a few rivers in Poland. *Subject Headings:* **1. Soil moisture retention 2. Hydrologic cycle 3. Poland.**—*A.A.*

6.3–282 551.579:551.509.3

Sapozhnikov, V. I., **Opyt prognoza gidrografa pavodka po summarnomy pritoky vody v rechnuiu set'.** [Forecasting the flood hydrograph by means of the total runoff in the river

ystem.] *Leningrad. Tsentral'nyĭ Institut Prognozov, Trudy*, 12(39):61-81, **1949.** 8 figs., 4 tables, 8 refs., 8 eqs. **DLC**—Study based on the theoretical short range flood forecasting method of KALININ (*see Ibid.*, 9(36), 1948), based on the equation of water balance and using the time of maximal discharge in the hydrograph as the main parameter. The hydrograph itself is represented by a trigonometric series (!?). The author gives a number of detailed forecasting samples, comparing inflowing runoff with the forecast and actual discharge. *Subject Headings:* **1. Runoff forecasting 2. Hydrographs 3. U.S.S.R.**—*A.A.*

6.3–283 551.579.2

*Ferry, S. and Lugiez, F. (both, *Direction de l'Exploitation d'Electricité de France*), **Previsions d'apports pendant la periode de fusion des reserves nivales.** [Forecasting discharge after a snow-melting period.] *I.U.G.G. International Association of Scientific Hydrology, Brussels*, **1951,** [*Transactions*], 3:174–196. pub. **1952.** 11 tables, 8 figs. **DWB**—The difficult problem of estimating areal precipitation in mountain regions is discussed on the basis of the water balance of seven catchment areas in the French Alps and Pyrenees, giving mean monthly and annual data for precipitation and runoff as well as hypsometric data. The author estimated annual evapotranspiration (D) assuming that $K = \frac{E_0+D}{P_0}$ is constant. E_0—annual runoff, P_0—mean annual rainfall measured in the network of stations. A detailed analysis is made for the correlation between winter precipitaion and runoff from each basin and the river flow from April to Aug., testing the results for 1949 and 1950. *Subject Headings:* **1. Snow melt runoff 2. Hydrologic cycle 3. Orographic effects 4. Alps 5. Pyrenees.**—*A.A.*

6.3–284 551.579.2:551.511.2

Yakuwa, R. (*Faculty of Agric., Hokkaido Univ.*), **On the soil erosion caused by the thaw water of snow and frozen soil.** *Geophysical Magazine, Tokyo*, 23(4):497–502, May **1952.** figs., 4 tables. **MH-BH**—Climatological data for Tokachi Province for the winter season, consisting of mean monthly and mean minimum air temperatures and depth of snow on ground, are presented. A simple experimental procedure for studying the degree of soil erosion caused by thaw water from snow and frozen soil is described. It is shown that in spring when the accumulated snow and the thin surface layer of the frozen soil begin to melt the remaining frozen layer of soil is impervious to the percolating water, and the water instead runs off slopes and causes erosion. Measurements on the degree of erosion for a specific instance are presented. *Subject Headings:* **1. Snow melt 2. Soil erosion 3. Tokachi Province, Japan.** —*I.L.D.*

6.3–285 551.579.2

Yosida, Zyungo; Kozima, Kenzi and Aoki, Sin-iti, **Experiments on melting of snow layer.** *Low Temperature Science*, Sapporo, Japan, 3:101–108, **1950.** 5 figs., 2 refs. In Japanese; English summary p. 108. **DWB**—The quantity w of snow melted by heat given off by air above determined experimentally w was expressed by formula

$$w = (0.0045+0.017v)\,\theta \text{g/cm hr},$$

v=wind speed m/sec, θ=air temperature °C. Using this formula, author calculated melting of snow using air temperature and wind speed data from Sapporo Meteorological Observatory. Calculated values agreed with actual snow melting at Sapporo. *Subject Headings:* **1. Snow melting rate 2. Snow melt formulas 3. Sapporo, Japan.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

6.3–286 551.58:63:06

Institut National pour l'Étude Agronomique du Congo Belge, Service de l'Agriculture Congolaise. [Agricultural service of the Congo.] Brussels, June **1954.** 100 p. 48 figs., charts, (2 fold.). **DA**—The division of climatology of INEAC operates a network of weather stations which includes a central station at Yangambi, 7 principal stations, 8 first order, 12 second and 29 third order stations which record the various climatic elements. The data

are published by the Bureau of Climatology of the INEAC. The type of agricultural research carried on in collaboration with other departments is described briefly. *Subject Headings:* **1. Agricultural climatology 2. Meteorological networks 3. Institut National pour l'Étude Agronomique du Congo Belge.**—*I.L.D.*

6.3–287 551.58(09)(47)

Rubinstein, E. S., **Trideset godina sovjetske klimatologije.** [Thirty years of Soviet climatology.] *Yugoslavia. Hidrometeorološka Služba. Hidrometeorološki Glasnik*, 1(2):70–79, **1948.** In Serbian. **DWB**—This is a translation of the paper which outlines progress and present status of climatology in the U.S.S.R., written by the author and published in *Akademiia Nauk SSSR, Ser. Geogr. i Geofiz., Izvestiia*, 11(5):425–432, 1947. *Subject Headings:* **1. Climatology 2. History of Climatology 3. U.S.S.R.**—*N.T.Z.*

6.3–288 551.58(99)

Schmitt, W., **Terre Adélie.** *Weather*, 7(9):288–289, Sept. **1952. DWB**—Brief summary of upper air temperatures, absence of tropopause, and katabatic winds. *Subject Headings:* **1. Climatology 2. Adélie Land, Antarctica.**—*C.E.P.B.*

6.3–289 551.58:697

Smith, George S. (*Univ. of Wash., Seattle*), **Climatic data needed for heat pump.** [Resumé of his **Climatology as an aid in heat pump design.**] *Heating and Ventilating*, New York, 49(1):76, Jan. **1952. DLC**—In his paper presented before the American Society of Heating and Ventilating Engineers, PROF. SMITH discussed the effect of climatic variations on the operation of heat pumps and described his methods of using U. S. Weather Bureau records for that purpose. *Subject Headings:* **1. Climatology 2. Heat pumps.**—*G.T.*

CLIMATIC ZONES

See also: **Atmos. temp. distrib.** (Schumann), 6.4–134

6.3–290 551.581(211.1)

Sverdrup, H. U., **Some problems in Arctic meteorology.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 69 73.) **DWB**—Introduction to the Symposium on Arctic meteorology, discussing in general terms processes of heating and cooling, and the winter inversion in cold weather; Arctic and Antarctic conditions are compared. *Subject Heading:* **1. Arctic meteorology.**—*C.E.P.B.*

6.3–291 551.581.62(02)(98/9)

†U. S. Bureau of Yards and Docks, **U. S. Navy, Civil Engineer Corps cold-weather engineering, chapters 1 to 5.** Wash., D. C., **1948–1949.** 109 p. photos., maps, diagrs., bibliog. p. 105–109. Its *Navdocks* P-17. **DLC**—In this handbook on the Arctic and Antarctic intended for use by Navy Construction Engineers (Seabees), the basic facts about climate, ocean currents, ice, permafrost, and problems in living and working in cold climates are outlined and illustrated. Many definitions are given, such as of the terms Arctic, Antarctic, ice and permafrost terms, etc. Climatic information is general rather than statistical. *Subject Headings:* **1. Engineering climatology 2. Handbooks 3. Arctic climates 4. Definitions 5. Arctic 6. Antarctica.**—*M.R.*

CLIMATE OF PARTICULAR PLACES

See also: **Agri. geography** (Monheim), 6.3–7; **Shelter belts** (George), 6.3–11; **Zonal distrib. of salinity, precip., evap. . . .** (Wüst), 6.3–13; **Climatic classification** (Gorczyński), 6.3–317.

6.3–292 551.582(51)

Chang, Chi-yun, **Climate and man in China.** Taipei, Taiwan, China, China Cultural Service, Oct. **1953.** (unchecked.) Review by C. H. Hsueh, in *Chinese Association for the*

Advancement of Science, Taipei, Taiwan, China, Bulletin, 1(5):4–6, Dec. **1953. DWB.** Revised and enlarged edition of an article which appeared under the same title in *Association of American Geographers, Annals,* 36(1):44–73, March 1946 with 25 figs. (incl. photos), and 25 refs. **DWB**—The article deals with the geographic distribution of climatic elements in China. It is divided into six sections: (1) seasons, (2) humid and arid regions, (3) farming belts, (4) drought and floods, (5) mountain climate and (6) climate changes. Particular attention is paid to the effect of climatic factors on the distribution of human settlements. Graphs and maps show the distribution of duration of season, Jan. and July isotherms, annual precipitation amounts, duration of growing season, agricultural regions, population, etc. *Subject Headings:* **1. Climate of China 2. Agricultural climatology 3. Bioclimatology 4. China. I. Hsueh, C. H.**—*G.T.*

6.3–293 551.582(267.4):656.6

*Great Britain. Hydrographic Office, **Bay of Bengal pilot. Comprising the southern and eastern coasts of Ceylon, the eastern coast of India, the east coast of East Pakistan, the coast of Burma and the western coast of Thailand from Pakchan River to Kq Phuket; also the Andaman and Nicobar Islands.** 8th ed. London, **1953.** 47+527 p. 14 plates, tables. **GB-MO**—Includes the usual section on general meteorology (p. xxxii–xlvii) and a chapter on climate and weather (p. 43–90) with full climatic tables for coastal stations. *Subject Headings:* **1. Pilot guides 2. Climatic data 3. Bay of Bengal.**—*C.E.P.B.*

6.3–294 551.582(469)

§Portugal. Serviço Meteorológico Nacional, **Condiçoes meteorológicas na costa de Portugal continental.** [Meteorological conditions on the sea coast of continental Portugal.] *Portugal. Serviço Meteorológico Nacional, Memorias,* No. 31; RT 139, March 10, **1954.** 17 p. 7 figs. Mimeo. **DWB**—This study includes the following: meteorological conditions in continental Portugal, prevailing meteorological conditions on the sea coast including mean values of barometric pressure and temperature, etc. and weather types along the sea coasts. Synoptic charts are included. *Subject Headings:* **1. Climatic studies 2. Weather types 3. Synoptic charts 4. Portugal.**—*I.L.D.*

6.3–295 551.582.1(438) 551.5:914.438(02)

Fleszarowa, Regina, **Polska informator geograficzny. Pt. 1, Fizjografia.** [Information on Poland's geography. Pt. 1, Physiography]. Warsaw, **1951.** 47 p. figs., table, map (fold.). Price: 5 zł. **DLC**—Handbook published by the Polish Geographical Society but not fully endorsed because of the unofficial character of some sources of information. Topics covered are: the geographical location, expanse, surface, border line, waters (seas and rivers) minerals, soils, mineral waters, vegetation, national parks and reservations. In the chapter on climate, the author gives a brief description of the climatic elements, divides the year into 6 seasons by adding: "fore-spring" (30–40 days beginning from end Feb.) and the "period of rains" in the late autumn (30–40 days from end Oct.) and divides the territory into 21 climatic-agricultural regions. A physical map, graphs and tables complete the work, which is intended chiefly for the use of teachers and students. *Subject Headings:* **1. Physical geography 2. Climate of Poland 3. Climatic seasons 4. Textbooks 5. Poland.**—*A.M.P.*

6.3–296 551.582.2(71)

*Dessureaux, L. and Godbout, E., **Thirty-five years of weather records at Sainte-Anne de la Pocatière.** *Quebec (Province). Bureau de Météorologie, Bulletin,* No. 16, n.d. 13–26 p. 7 tables, 6 figs., 11 refs. Reprinted from *Scientific Agriculture,* Ottawa, 29:13–26, Jan. **1949. DWB**—A nice statistical study of available climatic data for Sainte-Anne de la Pocatière Experiment Station, which lies 2 mi south of the St. Lawrence River in Quebec. The site is shown in photos taken from 4 directions, and is described in text. Frequency of rainless periods of specified length (0–24 days), and of sequences of rainy days (0–10 days) in each month April–Oct. as compared with expected values; monthly mean, range and standard deviation of mean temperature, mean maximum, mean minimum, maximum and minimum temperatures, daily range, percentage possibility and hours of sunshine, evaporation, hourly wind speed and direction for 1913–1947 are tabulated and discussed. Several graphs are

presented to show annual march of elements (precipitation, potential evapotranspiration, etc.). *Subject Headings:* **1. Standard deviation of climatic elements 2. Climatic data 3. Climate of Quebec 4. Sainte-Anne de la Pocatière, Quebec.**—*M.R.*

6.3–297 551.582.2(792)

*†Ellison, Lincoln, **Subalpine vegetation of the Wasatch Plateau, Utah.** *Ecological Monographs*, 24(2):89–184, April **1954.** 49 figs., 30 tables, bibliog. p. 183–184. **DLC**—Climatic factors are related to vegetation, grazing conditions, soil erosion and forests. On p. 94–98 there is a summary of the climate of the Wasatch Plateau, Utah, with special reference to air temperature, soil temperature, precipitation, soil moisture, wind, evaporation and soil erosion. Incomplete records from 1914–1934, and complete records from 1934–1948 for head of Ephraim Canyon (headquarters at 8850 ft and Meadows, at about 10,000 ft). Most of the temperature data for 1913–1935 are for summer; since 1935 records are complete for May through Oct. *Subject Headings:* **1. Climate of Wasatch Plateau, Utah 2. Ecology of subalpine regions 3. Wasatch Plateau, Utah.**—*M.R.*

CLIMATIC VARIATIONS

See also: **Atmos. poll. effects** (Hewson), 6.3–88; **Climatic variations** (Manley), 6.3–138; **Climatic changes** (Arkhangel'skiĭ), 6.3–337.

6.3–298 551.583(7)

†Ives, Ronald L., **Climatic studies in western North America.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 218–222. 39 refs.) **DWB**—Studies summarized include glaciers in Rocky Mountain region, water levels in Bonneville Basin of Utah and archaeological and documentary evidence from the southwestern deserts, all indicating considerable climatic fluctuations not yet fully worked out. There is evidence that some time long before 1500 A.D. the northern sea coast of N. America was ice-free for at least part of the year. *Subject Headings:* **1. Climatic variations 2. North America.**—*C.E.P.B.*

6.3–299 551.583:008

Sears, Paul B. (*Yale Univ.*), **Climate and civilization.** (In: Shapley, Harlow (*ed.*), **Climatic change.** Cambridge, Harvard Univ. Press, **1953.** p. 35–50. 4 figs., 27 refs.) **DLC**—In the discussion of the role of climate in the origin and development of civilization, the limits set by climate to civilization and the quality of civilization as an expression of climate, the author considers the role of climatic changes in shifting areas of food production and HUNTINGTON's theories of the stimulating role of climate upon creative effort and of climatic change as a major factor in the geography of civilization, and cites evidence contradicting the theories of HUNTINGTON. The role of climate as a limiting factor is discussed in the light of the fossil-pollen profile for Mexico City. *Subject Headings:* **1. Climatic changes 2. Civilization.**—*I.L.D.*

6.3–300 551.583

SHul'gin, A. M., **Ob izmenenii klimata g. Barnaula.** [On the change of climate of Barnaul.] *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Izvestiia*, 85(1):95–98, Jan./Feb. **1953.** 4 figs., 2 tables. **DLC**—Ten year averages given for precipitation (year, summer and winter) and annual temperature for the years 1838–1947. The temperature shows a remarkable constant increase, attributed mainly to the winter months. The measured precipitation has been fairly constant since 1888 but considerably higher than in the previous fifty years. *Subject Headings:* **1. Climatic variations 2. Long period records 3. Barnaul, Siberia.**—*A.A.*

6.3–301 551.583:529:634.94

Mikola, Peitsa, **Effect of recent climatic variations on forest growth in Finland.** *Fennia*, Helsinki, No. 75:69–76, **1952.** 3 figs., 2 fold. plates after p. 128, foot-refs. **DWB**—Study is based on one of the most extensive tree ring surveys ever attempted. Annual rings were measured on more than 6500 sample trees, including increment cores from over 2600 trees.

The majority of sample trees (4500) were Scotch pines, the rest Norwegian spruces. The most important weather factor influencing the growth of trees in Finland is the temperature of the growing season, especially at the timber line. Tree rings diagrams are given for eight zones (period 1880–1936) on the basis of the National Forest survey and also for selected localities covering the period 1750–1949. Recent advances of the northern timber line are outlined. *Subject Headings:* **1. Tree rings 2. Climatic variations 3. Tree line 4. Finland.**—*A.A.*

6.3–302 551.583:576.1

Mottl, Maria, **Eiszeit und eiszeitliche Fauna-Entwicklung.** [Ice Age and glacial development of fauna.] *Zeitschrift für Gletscherkunde und Glazialgeologie*, 2(2):287–297, **1953.** fold. table, 22 refs. **MH-BH**—Ice ages have been periods of rapid evolution but last great change of life began between mid and upper Pliocene with great crustal movements and a rapid fall of temperature. The changes of sea level during Quaternary aided changes of fauna and flora. Owing to cooling effect of great ice sheets, the lowest temperatures and greatest extension of Arctic life occurred late in the glacial periods. *Subject Headings:* **1. Climatic changes 2. Evolution.**—*C.E.P.B.*

6.3–303 551.583:631.48

Nikiforoff, C. C. (*U. S. Dept. of Agri.*), **Pedogenic criteria of climatic changes.** (In: Shapley, Harlow (*ed.*), **Climatic change.** Cambridge, Harvard Univ. Press, **1953.** p. 189–200, 3 refs.) **DLC**—From the geochemical point of view, the dynamics of soil is a function of the environment and its evolution consists of readjustments of soil systems to changes in climate, relief conditions of its parent material and vegetation. A general outline of the evolution of soils and the characteristics acquired by soils under different environmental influences are presented. The traces of various climatic types in soils are considered. *Subject Headings:* **1. Pedology 2. Environmental influences 3. Climatic changes.**—*I.L.D.*

6.3–304 551.583:061.3

Rathjens, Carl, **Der IV. Kongress der Internationalen Quartärvereinigung in Rom und Pisa 1953.** [The 4th congress of the International Quaternary Union in Rome and Pisa, 1953.] *Petermanns Geographische Mitteilungen*, 98(1):32–35, **1954. DWB**—This well attended "Inqua" Congress was occupied largely with eustatic variations of sea level due to glaciation, and their bearing on Quaternary correlation, about which there is still much confusion. Several papers dealt with chronology, including dating by radiocarbon and fluorine, isostatic elevation and MILANKOVITCH's radiation curve, but it is still too early to develop a world-wide correlation. New arguments were put forward about the number (2 or 3) of glacial maxima in the Wurm. *Subject Headings:* **1. International Quaternary Union, Congress, 1953 2. Climatic changes.**—*C.E.P.B.*

6.3–305 551.583(434):551.31

Scharlau, Kurt, **Periglaziale und rezente Verwitterung und Abtragung in den hessischen Basaltberglandschaften.** [Periglacial and recent weathering and erosion in the Hesse basalt mountain landscape.] *Erdkunde*, 7(2):99–110, June **1953.** 56 refs. English summary p. 99–100. **DWB**—Many basalt boulders in Hesse are covered with a glassy crust formed during Wurm glaciation and the boulder fields date from then. At lower levels these crusts have since been removed by humid conditions, leading also to soil changes. *Subject Headings:* **1. Climatic effects 2. Quaternary climatics 3. Hesse.**—*C.E.P.B.*

6.3–306 551.583.14

Pennsylvania Electric Association. Hydraulic Power Committee, **Symposium on climatic trends in Northeastern United States, Penn-Harris Hotel, Harrisburg, Pa., April 22–23, 1952. Minutes of the meeting.** [1952] 154 p. figs. **DWB**—Complete proceedings of conference where papers were given by H. C. S. THOM, JEROME NAMIAS, WALTER LANGBEIN, VINCENT SCHAEFER, EDWARD DEWEY, ROBERT TURNER and WILLIAM HIATT on various aspects of hydrology and climatology related to the problem of climatic changes or fluctuations in the northeastern part of the U. S. Papers are abstracted separately and appear under name of

each of above authors. Members and guests present, minutes of meetings, discussion of each paper and final general discussion, together with charts presented as slides, are included in report. *Subject Headings:* **1. Climatic trends 2. Precipitation trends 3. Symposia 4. New England 5. Pennsylvania. I. Schuleen, Ernest T. II. Williams, George E.**—*M.R.*

6.3–307 551.583.3:551.35

Ovey, C. D., **Evidence of climatic variation from the deep-sea floor of the Atlantic Ocean.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of thee Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 212–214. 8 refs.) **DWB**—A summary is given of work on species changes and chemical composition (CO_2, TiO_2 and Fe_2O_3) in cores of *Globigerina* ooze in Atlantic. *Subject Headings:* **1. Climatic variations 2. Ocean cores.**—*C.E.P.B.*

6.3–308 551.583.3

Shnitnikov, A. V., **Izmenchivost' gornogo oledeneniia Evrasii v pozdne- i poslelednikovuiu epokhu i ee absoliutnaia khronologiia.** [The variability of the mountain glaciology of Eurasia during the post glacial period and its absolute chronology.] *Akademiia Nauk SSSR, Doklady*, 90(4):643–646, June 1, **1953.** 2 figs., table, 17 refs. **DLC.** Also in: *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Izvestiia*, 85(5):558–576, **1953. DLC**—The 1850 year cycle of variation of the continental moisture in the Northern Hemisphere, established by the author, is correlated with various elements of mountain glaciation such as depression of the snow line, height of the terminal moraines deposited, length of glaciers, and the maxima of the different phases of retreat of the Wurm glaciation. The variability of glaciation in the central Caucasus and central Altaï is compared with the Wurm retreat in the Alps and with the absolute chronology of individual phases of the Wurm glaciation applicable to the 1850 year cycle. Empirical curves showing the variation of the height of snow line in the Caucasus and Altaï and the height of the position of the terminal moraines and lengths of glaciers with the 1850 cycles are presented. The exact correspondence of the various states of retreat of mountain glaciation from the Wurm maximum up until the present (generalized by L. A. VARDANIANTS) correspond very clearly to these curves. By extrapolating future glaciation minima and maxima their absolute prediction can be achieved. *Subject Headings:* **1. Glaciation 2. Eurasia.**—*I.L.D.*

6.3–309 551.583.7:523.74

Eigenson, M. S., **O vozmozhnoĭ prirode paleoklimaticheskikh izmenenii.** [On the possible nature of paleoclimatic changes.] *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Izvestiia*, 85(4):360–372, July/Aug. **1953.** 15 refs. **DLC**—A highly theoretical paper in which the author attempts to give a solar geophysical interpretation to the phenomenon of paleoclimatic changes, as well as the contemporary (20th century) changes of the earth's climate and explains them by the very important factor of variations in the activity of the sun. The theory developed here is not quite new, it was proposed briefly in 1945 by the author, by P. P. PREDTECHENSKII in 1948 and by AHLMANN abroad, and is supported by such Soviet scientists as L. L. BERG, V. V. SHULEĬKIN and others. *Subject Headings:* **1. Paleoclimates 2. Climatic changes 3. Solar activity.**—*A.M.P.*

MICROCLIMATOLOGY

See also: **Forest & yield** (D'iachenko), 6.3–179; **Shelter belts** (Gael'), 6.3–180; **Condensation nuclei** (Nolan), 6.3–235; **Snow cover effects** (Ball), 6.3–262; **Dirt polygons** (Richardson), 6.3–263; **Living with weather** (Brunt), 6.3–334.

6.3–310 551.584

Landsberg, H. E., **Symposium on microclimatology and micrometeorology. Introductory address by Chairman.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 226–227. 3 refs.) **DWB**—Definition of the terms and note on the practical importance of the numerous studies. *Subject Headings:* **1. Microclimatology 2. Micrometeorology.**—*C.E.P.B.*

6.3–311 551.584 551.586:63

*Mikhaĭlovskaia, S. A., **Vliianie expozitsii na meteorologicheskiĭ rezhim vozdukha i pochvy po nabliudeniiam v Batumskom botanicheskom sadu osen'iu 1935 g.** [The effect of exposure upon the meteorological regime of air and soil according to observations made in the Batum botanical garden during the autumn 1935.] (In: Leningrad, Agrogidrometeorologicheskiĭ Institut, **Materialy po agroklimaticheskomu raĭonirovaniiu subtropikov SSSR.** [Materials on the agro-climatic classification of the subtropics in the U.S.S.R.] Leningrad, Gidrometizdat., **1938.** 2:58–97. 12 figs., 37 tables.) **DLC**—Detailed agro-climatic regionalization, undertaken at several plantations, required a detailed knowledge of the effect of slopes of different orientation. Data obtained from special microclimatic observations of Mount Frida during Sept.–Oct. 1935 are discussed and presented tabularly and graphically. The conclusions show that the differences in temperature between the northern and southern slopes may reach 10°C at noon at the soil surface. The differences in air temperature decrease rapidly with height, and the soil temperature differences diminish with depth. Other conclusions give more details on differences of the meteorological regime and contain several suggestions for microclimatic amelioration for the purpose of agriculture. *Subject Headings:* **1. Microclimatology 2. Agricultural climatology 3. Batum, U.S.S.R.**—*N.A.S.*

6.3–312 551.584.31:551.588.2

Smirnov, V. A., **Osobennosti mikroklimata razlichno orientirovannykh sklonov po nabliudeniiam v Gul'ripshi (Abkhazia) zimoĭ 1934–1935 g.** [Microclimatic peculiarities of differently oriented slopes according to observations made at Gul'ripshi (Abkhazia) during the winter 1934–1935.] (In: Leningrad, Agrogidrometeorologicheskiĭ Institut, **Materialy po agroklimaticheskomu raĭonirovaniiu subtropikov SSSR.** [Materials on the agro-climatic classification of the subtropics in the U.S.S.R.] Leningrad, Gidrometizdat., **1938.** 2:51–57. 2 figs., 5 tables.) **DLC**—Microclimatic observations were carried out during Jan.–March 1935 in the Sukhum region in order to find the different slopes. Detailed description of instruments, method used and places of observation are presented. Results given in tables and graphs. Conclusions outline the essential differences. The greatest differences in air temperature are found in the air layer closest to the surface; they reached 10°C. The lapse rate is much greater on the southern slope; it reached 8° in the first meter above the surface. The differences in air temperature between the western and eastern slope are small during the day time and great in the morning and evening hours, reaching 2°–5° at the ground surface. No differences in humidity were found in the layer of 25–150 cm. The surface layer is greatly affected by the condition of soil (its moisture and temperature) and therefore great variations were observed. The highest soil temperatures at a depth of 0.05 m were observed on southern slopes and the lowest on northern ones, the difference reached 15°C at time of the maximum temperature. Soil temperatures on western and eastern slopes are very different at evening and in the morning, but are almost equal in the day time hours. *Subject Headings:* **1. Microclimatology 2. Meteorological elements 3. Topographic effects 4. Subtropic zone, U.S.S.R.**—*N.A.S.*

6.3–313 551.584.33:626.2(47)

Kokoulin, P. P., **V Tsymlianskoĭ gidrometeorologicheskoĭ observatorii.** [At the Tsymlianskaia Hydrometeorological Observatory.] *Meteorologiia i Gidrologiia*, No. 8:20–22, Aug. 1952. **DLC**—For a more effective service for water system of Volga-Don Canal a special hydrometeorological observatory was established at Tsymlianskaia on the Don River. The principal problems investigated are the hydrometeorological regime and microclimate in the canal region. Special attention will be paid to investigations of the water balance at the Tsymlianskaia water reservoir, local climate and microclimate in the reservoir region, thermic and ice conditions, and also to the problem of the swelling and formation of the channel of the water way. The observatory will work in cooperation with the State Hydrological Institute, Central Geophysical Observatory and the Central Institute of Weather Forecasting. *Subject Headings:* **1. Volga-Don Canal 2. Microclimatology 3. Tsymlianskaia Hydrometeorological Observatory, U.S.S.R.**—*N.T.Z.*

6.3–314 551.584.4:581.535.2(728)

Lötschert, Wilhelm, **Die Mangrove von El Salvador. "Amphibische" Pflanzenwelt tropischer Küsten.** [The mangroves of El Salvador. "Amphibian" plant world of tropical coasts.] *Umschau*, 55(2):47–50, Jan. 15, 1955. 13 figs. **DLC**—Mangrove formations occur in brackish water at several places on the coast of El Salvador. Vegetation is described with photos and profiles. Curves show hourly values on one day of temperature and evaporation (low) and relative humidity (high) compared with savanna. *Subject Headings:* **1. Mangrove swamp climate 2. El Salvador.**—*C.E.P.B.*

6.3–315 551.584.42:551.586:632.1:633.491

Hirst, J. M.; Long, I. F. and Penman, H. L., **Micrometeorology in the potato crop.** (In: American Meteorological Society and Royal Meteorological Society, **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. 1954. p. 233–237. 2 figs., 4 refs.) **DWB**—In study of virus diseases and blight, continuous records of wet- and dry-bulb temperature at 6 levels 10–230 cm in and above a potato crop at Rothamsted, with readings of a dew balance and wind record at 40–200 cm were made in summer 1952 and 1953. Specimen results are shown as curves and profiles of dew point and briefly discussed. *Subject Headings:* **1. Micrometeorology 2. Potato blight.**—*C.E.P.B.*

6.3–316 551.584.6:631.56

Kreutz, W., **Mietenklimaforschung und ihre praktische Bedeutung.** [Investigation of rick climate and its practical significance.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 32, 1952. p. 48–52. 7 figs., 2 tables. **DWB**—Three climatic points of view are important for the construction of ricks; 1) fast cooling and drying of the stored crops in autumn, 2) frost prevention in the winter and 3) heating prevention in the spring. Four types of ricks were tested: (I) rick on the surface in N–S direction with best ventilation, (II) a deep rick without ventilation, (III) a rick 25 cm in the soil in N–S direction, and (IV) a rick on the surface in E–W direction. Temperature variation outside, but not inside, the rick presented in graphical form. The best results are obtained with the first type of rick. *Subject Headings:* **1. Rick climates 2. Rick construction 3. Agricultural climatology.**—*A.A.*

CLIMATIC CLASSIFICATION

See also: **Evapotranspiration** (Guerrini), 6.2–223.

6.3–317 551.585:551.521.1:551.582.1(438)

*Gorczyński, Władysław, **Comparison of climate of the United States and Europe, with special attention to Poland and her Baltic coast.** *Polish Institute Series*, No. 7, **1945.** 288 p. tables, charts, refs. **DLC**—Several chapters of this book or collection of articles, have appeared in other publications and have been abstracted (*see items*, No. 1–46, 4–17, 2.5–29 and 2.5–174 in Jan. 1950, May 1950, and May 1951, respectively, *MAB*). The main theme of these essays is a comparison of the effects of sunshine in America and Europe, as represented by data on temperature, precipitation, cloud cover, total radiation and duration of sunshine. The author makes a decimal classification of world climate and attempts to define the "best type" of climate as that which is found in some parts of the Mediterranean, Floridian, and intertropical mountain zones. Many tables and isopleth charts give representative data for all of the critical elements in many locations. *Subject Headings:* **1. Climatic classifications 2. Climatic types 3. Climate of Poland 4. Solar climate 5. Poland. I. Polish Institute of Arts and Sciences in America.**—*M.R.*

6.3–318 551.585.53(64):631.4

Bryssine, Georges, **Les facteurs climatiques de la pédogénèse au Maroc.** [Climatic factors in pedology of Morocco.] *Morocco. Service de la Recherche Agronomique et de L'Experimentation Agricole, Les Cahiers de la Recherche Agronomique*, No. 2:41–70, 1949. 6 tables (5 fold.), graphs (fold.), bibliog. p. 69–70. **DWB**—An elaborate graphical and statistical study of the climate and soils of Morocco based on several systems of classification for pedology. It is shown that the DE MARTONNE aridity index $P/T+10$ and the LANG index $F_p=P/T$ give

similar values to widely differing soils. Therefore an index $E_c = P \times T$ is used as indicative of the "climatic energy" which tends to form soils or destroy them. An elaborate chart is presented to show how well the data for 14 soil types in all parts of Europe, Africa and America fit the curves of E_c or F_p—an examination of which indicates that though the fit for E_c is not good, that for F_p cuts across, rather than following the lines in almost every case. The actual data for 52 Moroccan stations, 27 in the U.S.S.R., 34 in other parts of Europe and the Near East and 17 in Equatorial Africa, with soil types for each, are presented in tabular form. Variations of each index from month to month in Morocco are also shown graphically and, finally, a soil type map for the country presented and characteristics of each zone described. *Subject Headings:* **1. Soil climatology 2. Aridity indexes 3. Climate of Morocco 4. Morocco.** —*M.R.*

6.3–319 551.585.53

Leighly, John, **Dry climates: their nature and distribution.** *International Symposium on Desert Research Jerusalem, May 7–14,* **1952,** *Proceedings,* p. 3–18. 5 figs., 10 refs. **Discussion,** p. 16–18. **GB-MO**—The distribution of dry climates in the N. Hemisphere is plotted—over land according to KÖPPEN's (1918) definitions of steppe and desert, over sea as areas where evaporation exceeds precipitation. Drought (3-month precipitation below 2 in.) in winter and summer is related to circulation at 10,000 ft and M.S.L. in Jan. and July. Variations of precipitation in the dry south-west of the U. S. 1867–1951 are plotted (July–Sept., Dec.–March) showing sequences of wet or dry seasons. Winter precipitation has correlation of −0.65 with mean zonal index (35–55°N lat.); relations with summer rainfall are less clear. Pleistocene lakes in south-west U. S. are attributed to winter precipitation associated with a low-index circulation (also favorable for glaciation). *Subject Heading:* **1. Drought areas.**—*C.E.P.B.*

6.3–320 551.585.55(47):631.548:633.18

Dement'ev, P. F. **Opyt kul'tury risa s periodicheskimi polivami v Alkhanchurtskoĭ doline Groznenskoĭ oblasti.** [Experiment on rice cultivation with periodic sprinkling in the Alkhanchursk Valley, Groznyi district.] *Vsesoiuznaia Akademiia Sel'skokhoziaĭstvennykh Nauk imeni V. I. Lenina, Doklady,* No. 7:8–14, **1952.** 5 figs., 5 tables, 2 refs. **DLC**—The Experimental Station of the Union Institute of Irrigation at Groznyi cultivated rice during 1950–1951 in Alkhanchursk Valley (6 km from Groznyi) without the permanent water layer over the field. Under conditions of a very dry climate during the growing season 4–5000 m³ of water per hectare were needed for sprinkling, and the harvest of rice reached to 40–50 centners (about 2 tons) per hectare. The wide-strip sowing is preferable to compact sowing, because the former is more resistant to drought and the control of weeds is easier. *Subject Headings:* **1. Sprinkling 2. Rice culture 3. Groznyi, U.S.S.R.**—*N.T.Z.*

6.3–321 551.585.7:581.9(213)

Schneider-Carius, K., **Klimazonen und Vegetationsgürtel in tropischen und subtropischen Gebirgen.** [Climatic zones and vegetation belts in tropical and subtropical mountains.] *Erdkunde,* Bonn, 2(4/6):303–312, **1948.** 20 refs. **DLC**—The vertical distribution of climatic conditions and characteristic vegetation zones is discussed, using as examples Kilimanjaro, Atlantic islands in the trade wind region, fog oases in Nubia and mountain plateaus in the Near East. The layer of frequent clouds is considered as an important factor, the height of which depends on the thickness of tropospheric base layer. *Subject Headings:* **1. Mountain climates 2. Phytogeography 3. Tropics 4. Subtropics.**—*A.A.*

BIOCLIMATOLOGY

See also: **Kona weather & asthma incidence** (Myers, Price), 6.3–172; **Wet bulb temps.** (Newman), 6.3–208; **Agri. climatology** (Mikhaĭlovskaia), 6.3–311; **Microclimatology** (Hirst, others), 6.3–315.

6.3–322 551.586:581.056

Crampton, E. W., **Problems of vitamin and other deficiencies dependent on climatic factors, exclusive of minerals and gross lack of food.** (In: Specialist Conference on Plant

and Animal Nutrition in Relation to Soil and Climatic Factors, Australia, 1949, **Proceedings,** Pub. 1951. p. 342–357. 3 tables, refs.) **DWB**—A consideration of the manner in which climate and soil may influence the level of nutrients in forage plants and in cereal grains. The digestible energy of hay crops declined from bloom to maturity and an inverse correlation exists between moisture supply to the plant and protein content of the grass. In the case of cereal crops the falling of the kernel is influenced by moisture and temperature, and protein concentration varies with climate, in particular, moisture of the soil. *Subject Headings:* **1. Climatic influences 2. Soil deficiencies 3. Soil moisture.**—*I.L.D.*

6.3–323 551.586:581.1

Suzuki, S. and Yoshida, Y. (*Kyushu Agric. Exp. Station*), **Temperature observation of some flowers and leaf-sheath of wheat.** *Journal of Agricultural Meteorology, Tokyo,* 6(3/4): 103–106, Aug. 1951. 5 figs., 5 tables. In Japanese; English summary p. 106. **DWB**—The main purpose of this experiment was to find out whether flowers always generate heat or not. The flowers examined are Poppy, Lily, Tulip and Snapdragon, and the temperature is measured every minute by means of thermo-junction. The result is that the temperature of the pistil as well as the perianth is always lower than that of the room. So the flowers belonging to the above species ought to be considered to act endothermally, quite contrary to *Arum italicum* and Lotus, etc. which have long been known to be exothermic. It is also noted that the leaf-sheath of wheat is seemingly a little warmer than the room. *Subject Headings:* **1. Plant physiology 2. Microclimate of plants.**—*Authors' abstract.*

6.3–324 551.586:581.13 551.586:591.13

†Specialist Conference on Plant and Animal Nutrition in Relation to Soil and Climatic Factors, Australia, 1949, **Proceedings.** London, Pub. by the Govt. 1951. 490 p. illus. refs. Price: £1.0s.0d. **DWB**—This conference was held in Adelaide and Canberra from Aug. 22 to Sept. 15, 1949. The proceedings contain a review (1) of present knowledge of the climatic and soil factors affecting nutrition of plants and animals; (2) the effects of specific soil and climatic factors on the nutrition of plants; (3) the nutritional problems of animal as determined by plants and soil and (4) the influence of plants and animals on soil fertility. All the papers have good bibliographies. The articles especially relevant to meteorology and climatology are abstracted separately. *Subject Headings:* **1. Agricultural climatology 2. Conferences. I. British Commonwealth Scientific Official Conference.**—*I.L.D.*

6.3–325 551.586:581.5

Albertson, F. W. (*Kansas St. Coll., Fort Hays, Kans.*), **Man's disorder of nature's design in the Great Plains.** *Smithsonian Institution, Annual Report,* 1950:363–372. 1951. 4 plates, bibliog. **DWB**—After an historical summary of the ecology of the Great Plains with brief reference to climatic factors, the author sums up some results obtained in recent studies of the growth of grass, especially those undertaken near Fort Hays. Some general conclusions are drawn as to the best use of pastures. *Subject Headings:* **1. Plant ecology 2. Climate of the Great Plains 3. Pastures 4. Great Plains, U. S.**—*G.T.*

6.3–326 551.586:581.9

Maričić, M. (*Belgrade*), **Meteorološki činioci i biljni svet.** [Meteorological factors and vegetation.] *Yugoslavia. Hidrometeorološka Služba, Vesnik,* 3(1/2):18–26, Jan./June 1954. 5 figs., table, 4 refs. **DWB**—Seven climatic vegetation types are described and their geographic distribution over the world discussed. *Subject Headings:* **1. Plant ecology 2. Phytogeography.**—*G.T.*

6.3–327 551.586:595.7

Lauscher, Friedrich, **Die Rolle mikroklimatischer Faktoren beim Massenauftreten von Waldschädlingen.** [The role of microclimatic factors in the mass manifestation of forest pests.] *Wetter und Leben,* 5(11/12):195–200, Dec. 1953. 2 figs., 5 tables, 3 refs. **MH-BH**—The mass appearence of the spruce moth (*Ocneria monarcha*) in the Alpine forests of Austria is attributed to the development of a rather large phase difference between the moth and its parasites when the temperature of the tree trunks where the moth eggs are laid rises more

rapidly than that of the forest soil which is the source of the moth parasites. This hypothesis is confirmed by studies of tree trunk and soil temperatures, relationship of temperature to daily cloudiness variation and the relationship between spring weather during the years 1927–1953 and sunshine days. An abnormally long period of good weather, for example more than 10 days, with sunshine during a spring month especially when they are consecutive is an indicator of a possible disturbance of biological equilibrium. *Subject Headings:* **1. Forest insects 2. Climatic effects on insects 3. Insect ecology.**—*I.L.D.*

6.3–328 551.586:595.7

Lenz, Friedrich, **Mückenverbreitung und Wetter.** [Distribution of gnats and the weather.] *Wetter und Leben*, 6(1/2):6–9, March **1954. DWB**—A discussion of the distribution and mass development of certain holometabolic insects, such as *Tendipes* (*chironomus*) *anthracinus Zett.* and *Tendipes* (*chironomus*) *plumosus L.* under the influence of climatic factors. These insects inhabit the eutrophic lakes of the Baltic ridge. When the larvae of *C. anthracinus* are ready for pupation in April, weather determines the number of emerging pupae; warm calm weather favors emergence and swarm formation. Also egg deposition and even distribution of the spawn depend upon favorable weather. *Subject Headings:* **1. Climatic effects on insects 2. Insect ecology.**—*I.L.D.*

6.3–329 551.586:598.2

Salt, George William (*Univ. of Calif., Davis, Calif.*), **The relation of metabolism to climate and distribution in three finches of the genus** *carpodacus*. *Ecological Monographs*, 22(2):121–152, April **1952.** 19 figs., refs. **DA**—The three morphologically similar finches of the genus *carpodacus*, namely, *C. mexicanus*, *C. purpureus* and *C. cassinii*, have distinct habitat preferences both for climate and life-form of vegetation. The metabolism of these finches to variations in atmospheric temperature and humidity is investigated experimentally and these responses are correlated with the temperature and humidity of stations within the breeding ranges of these species, expressed as climographs. A detailed description of the experimental procedure and a discussion of the results are presented. Correlated with the winter uniformity in temperature and humidity is a lessening of the segregation of the three species. With rising temperature the birds segregate into their individual breeding ranges. The metabolic rate of *C. mexicanus* below 90°F is lower than that of the other species provided the vapor pressure is low. *C. purpureus* is more efficient metabolically at higher temperatures up to 95°F with high humidities. *C. cassinii* has a lower metabolic rate at all temperatures below 85°F than *C. purpureus* and is less efficient at temperatures above 70°F with high humidity. The interaction of climate and vegetation in producing segregation is discussed and the climatic limits are related to the climatic regions classified by Thornthwaite's scheme. *Subject Headings:* **1. Bioclimatology 2. Bird ecology 3. Finches 4. United States.**—*I.L.D.*

6.3–330 551.586:599

†Sauberer, Franz (*Zentralanstalt für Meteorologie und Geodynamik, Vienna*), **Wetter, Klima und Leben. Grundzüge der Bioklimatologie.** [Weather, climate and life. Bases of bioclimatology.] Vienna, Verlag Brüder Hollinek, **1948.** 120 p. 15 figs., 56 refs. **DWB**—A nontechnical and brief account of bioclimatology with special emphasis on the effect of climate upon man and upon plants. The discussion is concerned primarily with the physical aspects of the bioclimate. It is based chiefly upon research on bioclimatology carried out in Germany where more attention is given to the response of the human organisms to meteorological factors, such as air masses, fronts, stratospheric electricity and the individual meteorological variables and comparatively little attention to various aspects of thermal heat balance. Non-German research on human bioclimatology and animal bioclimatology are hardly mentioned. The contents of this book are as follows: the chemical and physical effects of the atmosphere; the physical aspects of radiation and its biological effects; the role of evaporation, atmospheric moisture, dew, precipitation; temperature and heat properties of the environment and of animals; thermal exchange between organism and environment; atmospheric electricity; air masses and fronts; response of man to weather; the föhn effect; rhythms and periods; phenology and the bioclimatology of various biotopes (such as air and water media). *Subject Headings:* **1. Bioclimatology 2. Phenology 3. Human activity.**—*I.L.D.*

6.3–331 551.586:599:551.524.34(481

Wildhagen, Aage, **Litt om varmereguleringen og vare låndpattedyr.** [Notes on the heat balance and our land mammals.] *Naturen*, 76(3):80–93, **1952.** 2 figs. **DLC**—Deals with the governing principles (BERGMANN's and ALLEN's rules) of heat loss of some homothermic mammals in Norway. Direct correlation between body structure and biology of the animals and their (climatic) distribution is apparent. However, whether the change that takes place in the Norwegian fauna depends on temperature changes is undecided. The tendency is that the homothermic animals are increasing in number whereas the poikilothermic are on the decrease. *Subject Headings:* **1. Animal ecology 2. Temperature trends 3. Norway.**—*W.N.*

6.3–332 551.586:

Galagan, Donald and Lamson, Glenn G., Jr., **Climate and endemic dental fluorosis** Review in *U. S. Public Health Service, Public Health Engineering Abstracts*, 33(8):39–40 Aug. **1953. DLC**—The intensity and severity of endemic dental fluorosis was studied in 720 children in several Arizona communities in the desert where the mean annual temperature is approximately 70°F, the mean relative humidity 37%, percent of possible sunshine 80 to 85%, and daytime temperatures are extremely high. A comparison of the community fluorosis indices for the Arizona communities with those obtained from selected and midwestern communities and the same indices but with different climatic conditions indicates that fluorosis occurs at about twice the intensity in Arizona communities as in the midwestern area. It is suggested that because of climatic conditions Arizona children drink more water than children living in a more temperate climate so that they ingest more fluoride in relation to the concentration found in the water supply. *Subject Headings:* **1. Fluoride 2. Dental fluorosis 3. Temperature effects 4. Climatic influences 5. Arizona.**—*I.L.D.* (*Based on authors' abstract.*)

6.3–333 551.586:612.01

*†Ames, Adelbert and Goldthwait, David A., **Influence of cold climate on basal metabolism** *U. S. Quartermaster Corps. Research and Development Branch, Environmental Protection Series, Report*, No. 136, Sept. 22, **1948.** 13 p. 2 tables, 46 refs. **DWB**—Basal metabolism tests on 11 subjects transferred from Lawrence, Mass., to Churchill, Manitoba, in period Oct. 1947–May 1948 show that no significant change in metabolism was experienced by 10 subjects as a result of change from warm climate to a cold climate, and a significant change did occur in the one subject who was most exposed to cold weather (5.1 hours a day on average at temperatures averaging −15° to −20°F. The other subjects were indoors most of the time at both locations. Climatic and metabolism data are given. *Subject Headings:* **1. Climatic effects on metabolism 2. Churchill, Manitoba.**—*M.R.*

6.3–334 551.586:612 551.584.

Brunt, Sir David, **Living with the weather.** *London. Royal College of Science, Scientific Journal*, 22:79–91, **1953.** 11 figs. **DLC**—Processes of heat regulation of the human body are described, with special reference to wet bulb temperature, rate of perspiration and heat stroke. A classification of climates by degree of comfort is described, based on temperature and relative humidity of the air, illustrated by Singapore, Khartum, Rangoon, Kew (London) and Medicine Hat. S. E. England away from town smoke is described as one of the best climates in the world. Airflow down a slope is shown by models, and effect of soil is considered. *Subject Headings:* **1. Bioclimatology 2. Topographic effects.**—*C.E.P.B.*

6.3–335 551.586:61

†Coon, Carleton S. (*Penn. Univ.*), **Climate and race.** (In: Shapley, Harlow (*ed.*) **Climatic change.** Cambridge, Harvard Univ. Press, **1953.** p. 13–34.) **DLC**—A discussion of the physiological and organic adaptations of animals (including man) to climate and the bearing of these adaptations to the problem of human races. The geographically correlated variations in animals as expressed by Gogers' rule, Bergmann's rule, Allen's rule and Reusch's rules are reviewed and are then applied to an analysis of man's racial history and to the origin of the climatically adaptive characteristics of races of man such as skin color, size, therma

regulation, metabolism, etc. *Subject Headings:* **1. Climate and man 2. Physiological climatology 3. Acclimitization.**—*I.L.D.*

UPPER AIR CLIMATOLOGY

6.3–336 551.587(494)

*Ackermann, Paul, **Klima der freien Atmosphäre. Bearbeitungen der Aerologischen Station Payerne, 1948–1951 [and] . . . 1952.** [Climate of the free atmosphere. Compiled from radio soundings of the aerological station at Payerne, 1948–1951 [and] . . . 1952.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, v. 89, **1952**, pub. 1953. 14 p. appended to Anhang No. 7. 8+5 figs., 6+18 tables. **DWB**—Detailed tables and graphs of means and frequencies of temperature, pressure, humidity and wind speed and direction from 850 mb level (or 13 km), presented for months and seasons. *Subject Headings:* **1. Radiosonde data 2. Upper air climatology 3. Payerne, Switzerland.**—*M.R.*

ENVIRONMENTAL INFLUENCES

See also: **Temp. profiles** (Duckworth, others), 6.3–132; **Microclimatology** (Smirnow), 6.3–312.

6.3–337 551.588.1551.583.7

Arkhangel'skiĭ, A. M., **O nekotorykh voprosakh evoliutsii klimatov.** [On the evolution of climates.] *Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, Izvestiia*, 85(4):438–449, July/Aug. **1953.** bibliog. p. 448–449. **DLC**—Using available data, author discusses the question of whether or not a progressive drying of the climate of the Northern Hemisphere took place in the geological past or is taking place in present historical time. Author concludes that a review of the material indicates: 1) a growth of aridity during the Mesozoic and Cenozoic eras, 2) increase of differentiation of geographic landscapes, 3) a general rise of continentality, dryness and cooling of the climate and 4) increase of erosion and denudation of soils. This natural course of proceedings can be stopped only by the socialistic plan of transformation of nature. *Subject Headings:* **1. Aridity 2. Climatic changes 3. Northern Hemisphere.**—*A.M.P.*

6.3–338 551.588.1

Ivanov, N. N., **Ob opredelenii velichiny kontinental'nosti klimata.** [Determination of the degree of continentality of climate.] *Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia*, 85(4):455–457, July/Aug. **1953. DLC**—A new method of determining the continentality of the climate of a point is introduced. It is based on the contrasting interaction of oceanic and continental influences on air masses. The continentality of climate is expressed by the deviation of the yearly temperature range of a given point from the mean amplitude of the given parallel, where the yearly temperature range of a point coincides with the mean latitudinal amplitude. The continentality of climate equals 0. Positive deviations express the degree of continentality, negative the degree of oceanity. Advantage of this method of expressing continentality is that it gives a physically comprehensible value in customary units. The formula expressing continentality is very simple: $K = A_1 - A_0$, where A_1 is the mean yearly temperature range of the point and A_0 the mean yearly latitudinal temperature amplitude of the whole parallel. A table of mean latitudinal air temperature amplitudes from 0 to 80 in the Northern Hemisphere and a map of continentality in Eurasia complete the paper. *Subject Headings:* **1. Continentality 2. Oceanic influences 3. Northern Hemisphere 4. Eurasia.**—*A.M.P.*

6.3–339 551.588.6:551.577

Howell, Wallace Egbert, **Forests in relation to rainfall.** Address presented at the annual luncheon Wednesday, March 25, and the discussion on it at the general session on Forest Management, March 25. *Canadian Pulp and Paper Association. Woodlands Section, Montreal, Canada*, 1953 *Annual Meeting Release*, No. 10, **1953.** 4+3 p. 8 refs. **DWB**—Trees are more or less sensitive to rainfall or drought conditions, depending on whether in tropics or Arctic, or because of insects, fire damage or soil moisture conditions which vary with rainfall.

Usually the effect of drought years is felt only after several years in a row. Trees respond more rapidly to moist periods. The effect of frosts or rainfall is also important. From 5 to 60% of rainfalls of 0.25 inch or more never reach the ground, but evaporate from leaves of trees. In Germany, reforestation is said to have increased precipitation 6% and in the Congo Basin 30% more rain fell in a forest than a cleared area. It is thought that the effect is achieved only in case of shower precipitation (convective type). Finally, an optimistic view is expressed toward rain making possibilities by cloud seeding: an increase of 20 to 30% for most places being in the author's opinion a conservative estimate. *Subject Headings:* **1. Forest rainfall 2. Precipitation interception by forests 3. Soil moisture 4. Cloud seeding.**—*M.R.*

6.3–340 551.588.6:63

Roller, Kálmán, **A mezővédő erdősávok szerepe a viljamszi komplexumban.** [The role of shelter belts in the "Viliams complex."] *Agrártudomány*, Budapest, 2(12):709–714, Dec. **1950.** 4 figs., photo, ref. Russian and English summaries p. 714. **DLC**—Climatic effects of shelter belts are discussed in general and in terms of increased crop yield (as shown in experimental fields in Russia and Hungary). Various types of forest belts are described with instructions for planting them. Properties of several species of trees are specified in connection with Hungarian low-land soils and growing conditions. A diagram showing the effect of shelter belts on wind speed is presented. LYSENKO's method is recommended for designing shelter belts. *Subject Headings:* **1. Shelter belt effects 2. Agricultural microclimatology.** —*G.T.*

6.3–341 551.588.6:551.579

A vizszabályozó erdö. [Water-regulating forest.] *Élet és Tudomány*, Budapest, 6(47) 656–658, 661, Nov. 21, **1951.** photos. **DLC**—The effect of forests on precipitation, evaporation, runoff, infiltration and snow melt is discussed. *Subject Headings:* **1. Forest influences 2. Water balance.**—*G.T.*

6.3–342 551.588.6/7

†L'vovich, M. I., **O metodike proektirovaniia lesnykh polos na poliakh kolkhozov i sovkhozov.** [Method for planning forest zones in the fields of collective and state farms.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograficheskaia*, No. 3:3–17, **1952.** 4 figs., bibliog p. 16–17. **DLC**—After pointing out that the usefulness and indispensability of creating protective forest belts in South Russia was recognized as early as 1894 by the well known geographer V. V. DOKUCHAEV who designed 3 kinds of such belts (wind protecting, snow retaining and moisture collecting), the author presents a summarized report on actual methods and rules governing the planning and development of forest belts in the south part of U.S.S.R. *Subject Headings:* **1. Shelter belts 2. Forest influences 3. U.S.S.R.**—*A.M.P.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Marine meteorology** (Rodewald), 6.3–43.

6.3–343 551.590.22:550.384.3

*Bullen, J. M. and Cummack, C. H. (*Geophysical Obs., Christchurch, N. Zealand*), **The lunar diurnal-variation of the earth's magnetic field for all elements at Amberley, New Zealand.** *Journal of Geophysical Research*, 58(4):554–556, Dec. **1953.** 5 tables. **DLC**—*Subject Headings:* **1. Lunar diurnal magnetic variations 2. Amberley, New Zealand.**

6.3–344 551.590.23:551.509.58:621.396.8

*Nelson, J. H., **Planetary position effect on short-wave signal quality.** *Electrical Engineering*, 71(5):421–424, May **1952.** figs., table, 4 refs. **DLC**—Correlation over seven years established author's hypothesis that certain planetary positions affect short-wave signals. Possibly (particularly in the case of multicycles) the influence of solar planets on the sun will

ause temporary changes in the sun's characteristic radiation which is registered by the iono-phere, apparently sensitive to these changes. Based on solar observation, planetary indica-ions and a day-to-day signal analysis, the 24-hour forecasting system developed by the RCA Communication Inc., averaged close to 85% throughout 1950 and 1951. *Subject Headings:* **. Planetary influences 2. Ionosphere 3. Radio communication forecasting.**—*W.N.*

6.3–345 551.590.24

Athay, R. Grant; Billings, Donald E.; Evans, John W. and Roberts, Walter O. (*High Altitude Obs., Harvard Univ. and Colorado Univ., Boulder*), **Emission in hydrogen Balmer lines nd continuum in flash spectrum of 1952 total solar eclipse at Khartoum, Sudan.** *Astro-hysical Journal*, 120(1):93–111, July **1954.** 4 figs., 4 tables, refs., 22 eqs. **DWB**—Analysis f the spectrograms of the chromospheric flash obtained at the 1952 solar eclipse in Khartoum, udan, presented serious photometric problems. Standardizing exposures made at Khartoum ere not successful because of a posteclipse failure of the film-advance mechanism. Character-tic curves obtained from lamp exposures made in Boulder after completion of the expedition ould not be trusted to represent the photometric properties of the eclipse films and were rincipally useful as a first approximation to the curves representing the eclipse spectrograms. Methods were developed that, in spite of these problems, allowed entirely reliable determina-ions of the characteristic curves of the eclipse films. A thorough, independent check on the onsistency and accuracy of the final curves was possible, and its result was entirely satisfactory. Change with wave length of film sensitivity, atmospheric absorption, and optical constants of he spectrographs were evaluated and included in the photometry. The integrated intensities f the hydrogen Balmer lines from $H8$ to $H31$ and at four wave lengths in the Balmer con-inuum were measured at two points on the east limb on seventeen ultraviolet spectrograms; nd the intensities of $H\beta$, $H\gamma$, and $H\delta$ were measured at one of these points on nineteen visible pectrograms. The observations extend from 100 to 6300 km, with a height resolution of 108 m throughout most of the low chromosphere. Preliminary interpretation of the line in-ensities revealed that the effects of self-absorption were pronounced and also demonstrated hat there were large departures from thermodynamic equilibrium, in the sense that the bn's ere greater than 1 at 1000 km and increased with height. A preliminary interpretation f the continuum data gave a chromospheric model characterized by a large increase of tem-erature with height and a relatively low electron-density gradient. A more detailed analysis f the data is in progress. *Subject Headings:* **1. Solar eclipse, Feb. 1952 2. Eclipse photo-raphy 3. Balmer lines 4. Spectroscopy 5. Khartoum, Sudan.**—*Authors' abstract.*

6.3–346 551.590.25:621.396

Eshleman, R. and Manning, Laurence A., **Radio communication by scattering from eteoric ionization.** *Institute of Radio Engineers, Proceedings*, 42(3):530–536, March **1954.** figs., 15 eqs. **DWB**—By a consideration of the amplitude and duration of echoes forward-cattered from individual meteor ionization trails, and of the probability of detecting randomly riented trails over an oblique radio propagation path, an estimate of the contribution of eteoric ionization to extended range hf and vhf radio transmission has been obtained. It as been concluded that meteoric ionization alone would give a virtually continuous signal or a transmission path of about 1000 km at frequencies near 15 mc. For the very high fre-uencies, scattering from meteor trails has been found to be at least an important contributing ctor to the propagation of a signal over an oblique path. A precise evaluation of the role of is process must await a better determination of the number of trails as a function of their nization density. *Subject Headings:* **1. Radio communication 2. Radio wave propagation Meteoric ionization.**—*Authors' abstract.*

6.3–347 551.590.25

Meteors. Mediterranean Sea. *Marine Observer*, 23(162):206, Oct. **1953.** fig. **DWB**—ketches of trail of meteor on Nov. 15, 1952, showing remarkable deformation during 8 minutes. *ubject Heading:* **1. Meteor trails.**—*C.E.P.B.*

6.3–348 551.590.25

Opik, Ernst, **Researches on the physical theory of meteor phenomena, III. Basis of e physical theory of meteor phenomena.** *Tartu. Ütikool, Acta et Commentationes Uni-*

versitatis Tartuensis (Dorpatensis), Ser. A, 33(1), **1939.** 69 p. 9 tables, refs. p. 68, 76 eqs **DLC**—Air density and composition enter into the calculations of the theory of meteors pre sented here in detail with one chapter devoted to this aspect—based on available informatio and models as of the date of the paper. The theory involves an explanation of the followin physical phenomena: height range of visible radiation, vaporization or spraying rate, hea transfer, air cap, length of trail, etc. The present paper presents merely a first approximation a later paper was to give a second approximation. *Subject Headings:* **1. Meteor theor 2. Stratosphere density.**—*M.R.*

OPTICAL PHENOMENA

See also: **Seasonal sodium variation** (Barber), 6.3–127; **Vertical motion** (Paton), 6.3–200.

6.3–349 551.593.53:551.21:523.3

De Vaucouleurs, G. and Jacobs, L., **Dust clouds in the stratosphere.** *Meteorologica Magazine*, London, 83(988):311–312, Oct. **1954.** 3 refs. **DWB**—De Vaucouleurs at tributes abnormal darkness of earth's shadow in total lunar eclipse of July 26, 1953, to dus clouds in the stratosphere from Alaska eruption of July 9. Jacobs comments on dust layer at 22 km above Germany. *Subject Headings:* **1. Volcanic dust 2. Dust haze 3. Lunar eclipses** —*C.E.P.B.*

6.3–350 551.593.5:546.21

Timofeeva, V. A., **O rasseianii sveta mutnymi sredami.** [Scattering of light throug turbid media.] *Priroda*, Moscow, 41(6):98–100, June **1952.** fig. **DLC**—A general qualita tive discussion of the penetration of light below the surface of sea water, illumination of se water and its relationship to extinction and scattering, the variation of brightness with dept (illustrated by a graph) on the basis of experimental laboratory studies and the actual condi tions of illumination in the sea. *Subject Heading:* **1. Scattering of light in water.**—*I.L.D.*

6.3–351 551.593.5

Antonov, L. V., **Zeleny; luch.** [Green flash.] *Vsesoiuznoe Geograficheskoe Obshchestv SSSR, Izvestiia*, 86(1):102–104, Jan./Feb., **1954.** table. **DLC**—Between 1895 and 1948 th author was recurrently able to observe a green flash after sunset. A table giving the yea and place and number of observations is given. This phenomena was never observed befor sunrise. The relationship of this phenomenon to latitude and weather season is discussed *Subject Heading:* **1. Green flash.**—*I.L.D.*

6.3–352 551.593.5

Green flash. *Marine Observer*, 24(165):144–145, July **1954. MH-BH**—A number o observations of green flash in July and Sept. 1953 are recorded and discussed, including thre of blue flash and one (Japan Sea) of a violet flash. Capt. P. P. O. Harrison in New Zealan waters observed a green flash followed by a steady emerald ray. *Subject Heading:* **1. Gree flash.**—*C.E.P.B.*

6.3–353 551.593.52:551.509.3

Lagarmilla, Roberto, **Las rayas telúricas del espectro solar.** [Telluric rays of the sola spectrum.] *Revista Meteorológica*, Montevideo, 11(42/43):284–292, July/Oct. **1952.** 2 figs table, 5 refs. **MH-BH**—Current knowledge on solar spectroscopy, on the identification o telluric rays and on their use as an aid to weather forecasting is summed up in a popula manner. A table identifying the bands of the visible solar spectrum and two sample spectra diagrams are presented. *Subject Headings:* **1. Spectroscopy 2. Local forecasting.**—*G.T.*

6.3–354 551.593.5

Le Grand, Yves and Lenoble, Jacqueline, **Couleur du ciel crépusculaire au zénith.** [Th color of the twilight sky at the zenith.] *Académie des Sciences, Paris, Comptes Rendu* 238(25):2435–2437, June 21, **1954.** fig., 4 refs. **DWB**—The blue color of the twilight sk at the zenith, which is due to selective diffusion and to absorption by ozone, varies little i respect of its predominant wavelength (480 mμ) while the sun sets from +4° to −4°; i

urity, however, undergoes a minimum when the sun is at the horizon. *Subject Headings:* . **Sky light color 2. Twilight.**—*Trans. of authors' abstract.*

6.3–355 551.593.55:535.33

Dufay, Maurice (*Lyon, France*), **Excitation de la rais $^4S-{}^2D$ de l'atome d'azote dans la aute atmosphère, au crèpuscule.** [Excitation of the $^4S-{}^2D$ ray of the nitrogen atom in the pper atmosphere at twilight.] *Société Royale des Sciences de Liège, Mémoires*, Ser. 4, 12(1/2): 41–146, **1952.** table, refs. **DLC**—Results of measurements of the forbidden 5199Å line n 50 spectrograms obtained in clear weather from May 1950 to Aug. 1951 at the Haute 'rovince Observatory using a Cojan spectrograph at F/0.65 with dispersion from 180 Å/mm o 5200 Å beginning when the sun was 10–15° below the horizon. The $^4S-{}^2D$ ray was not bse:ved at solar depression of <11.4° but is always present at about 12° solar depression. t >13.3° angle it is more feeble during the rest of the night. This depression (ca. 12°) the same as for maximum intensity of N_2^+ bands. *Subject Headings:* **1. Nitrogen spectra . Twilight spectra.**—*M.R.*

6.3–356 551.593.55

Gruner, Paul, **Dämmerungserscheinungen.** [Twilight phenomena.] *Handbuch der eophysik*, Berlin, 8:432–526, **1942.** figs., tables, refs. **DWB**—Twilight begins somewhat efore sunset when the sky begins to color (10°–15° solar altitude). Civil twilight, astro- omical twilight, night airglow and the zodiacal light are all defined and discussed in the first art of Ch. 8 of this Handbook of Geophysics. The history of studies of the twilight from RISTOTLE and the first measurements (NUÑEZ, 1541) are given. Various phenomena (color, ptical phenomena and related conditions such as turbidity), actual observations in various titudes and heights; geometry, instrumental measurements and calculation; theoretical alculations for a pure cloudless atmosphere, zodiacal light, the purple light, photometry of fterglow and alpine glow, relation of theoretical to empirical results, the earth's shadow; eriodic variations in twilight phenomena, volcanic dust and eruptions, air mass and local nfluences are discussed. *Subject Heading:* **1. Twilight phenomena.**—*M.R.*

6.3–357 551.593.55

Kaplan, Joseph, **Investigation of impact ionization.** California. Univ. Institute of eophysics, Contract AF 19(122)-453, Report No. 1, March 1–June 1, **1951.** 4 p. 3 refs. **WB**—Exploratory experiments are described in which the effect of minute trace of impurities n the excitation of the first-negative bands of the nitrogen molecular ion is studied. Some sults of studies on afterglow in which water vapor is introduced indicate remarkable effects n cleanup rates of nitrogen and on intensity distribution and on intensities of the afterglow. reliminary studies indicate that these effects are connected with the role of ozone in the after- ow processes. The importance of this result is emphasized by the role of ozone in the excita- on of the Meinel OH band and the Kaplan-Meinel O_2 band. *Subject Headings:* **1. Nitrogen fterglow 2. Ozone effects. I. California Univ. Institute of Geophysics II. Contract F 19(122)-453.**—*Author's abstract.*

6.3–358 551.593.55

Link, F., **Quelques théorèmes relative aux effets crépusculaires dañs les couches lumines- nts élevées.** [Some theorems on the twilight effects in the high luminescent layers of the tmosphere.] *Société Royale des Sciences de Liège, Mémoires*, Ser. 4, 12(1/2):155–159, **1952.** refs. **DLC**—Theoretical treatment extending work of BARBIER, ELVEY and FARNSWORTH garding sodium (NA) luminiscence in the twilight sky. It is in the layer from 75–115 km ompared with that at <50 km) that the contrast in brightness caused by uneven distribution Na in the atmosphere attains a maximum. *Subject Headings:* **1. Twilight luminescence Sodium in atmosphere.**—*M.R.*

6.3–359 551.593.55:551.521.4

Oldenberg, O. (*Lyman Lab. of Physics, Harvard Univ.*), **Active nitrogen, airglow.** *Physical eview*, N. Y., 90(5):727–730, June 1, **1953.** refs. **DWB**—The theory of the "Lewis-Rayleigh terglow" of nitrogen, originally given by CARIO and KAPLAN, is modified by taking into

account recent work regarding resonance in collision processes and the value of the energy of dissociation of N_2, accepted in this paper as 9.76 ev Kaplan's "auroral afterglow," in which the spectrum of N_2^+ is observed, is tentatively explained by ionization caused by collisions of two metastable molecules. The results are applied to the airglow. *Subject Heading:* **1. Nitrogen afterglow.**—*Author's abstract.*

ELECTRICAL PHENOMENA

See also: **Clouds, precip. & thunderstorm elec.** (Shishkin), 6.3–1; **Atmos. electricity** (Chalmers), 6.3–3; **Radar echoes from lightning** (Jones), 6.3–39.

6.3–360 551.594:621.396

Isted, G. A., **Atmospheric electricity and long distance very high frequency scatter transmission.** *Marconi Review*, London, 17(113):37–60, 2nd quarter, **1954.** 10 figs., 15 refs. **DLC**—During an investigation into the behavior of long distance transmissions on very high radio frequencies a new phenomenon has been encountered which has a direct relation to electrical discharges from ordinary clouds in the lower atmosphere. Signals radiated in the 30–100 Mc/s band and transmitted to distances of 500 km and more, arrive at the receiver in a succession of impulsive bursts. A theory has been evolved to show how electrical discharges from clouds can form pockets of intense ionization in the E region; furthermore, the theory suggests that ordinary clouds, distinct from thunderstorm clouds, may be the chief electrical generators which maintain the fine weather vertical potential gradient. It is also suggested that when energy is transferred from discharging clouds to fine weather areas, continuous partial ionization of the E region conduction path is set up and in extreme cases may result in the formation of sporadic E. *Subject Headings:* **1. E layer 2. Sporadic E layer 3. Radio wave propagation 4. Atmospheric electricity.**—*From author's abstract.*

6.3–361 551.594:551.515.3

Uchikawa, K., **The disturbance of the electric field in the atmosphere at dust storm. Second report.** *Tateno. Aerological Observatory, Journal*, 5(1):10–14, March **1951.** 3 figs. 8 refs. English summary p. 10. **DWB**—Experiments on the charge of dust particles showed that the larger particles have positive, and smaller particles negative, charges. Diurnal variation of condensation nuclei in the winter during calm and windy weather was studied. *Subject Headings:* **1. Dust charges 2. Atmospheric electricity 3. Condensation nuclei 4. Dust storms.**—*A.A.*

6.3–362 551.59

Wait, G. R. and Parkinson, W. D., **Investigation of electrical properties of the atmosphere.** Wait, G. R., Contract AF 19(604)-251, Final Report, May 12, **1953.** 7 p. 8 figs., 3 refs. **Idem*, **Appendix to Final Report.** *Ibid.*, May 12, 1953. 11 p.+621 tables. 9 refs., 11 figs. **DWB**—The atmospheric-electric elements recorded at the Tucson Magnetic Observatory over the period 1935–1951 have been scaled, reduced to appropriate units and tabulated. The elements involved are: (i) Potential gradient, (ii) Positive conductivity, (iii) Negative conductivity. The appendix of this report contains 621 tables, each of which presents the hourly mean values of one of these elements for one month. The appendix also contains nine tables of monthly mean diurnal variations of air-earth current density. (The "monthly mean diurnal variations" are sets of 24 values obtained by averaging hourly means for the same hour of all days of a month.) These have been derived from the monthly mean diurnal variation of potential gradient and total conductivity. The object of this project is partly to collect the data into a form which can be most easily available for further analysis, and partly to establish a norm from which possible influences of the atomic energy program in the future can be measured. These data have been analyzed for diurnal, seasonal, and secular variation and for possible influences of the nuclear explosions which have taken place up to the end of 1951. No effect of the Tucson atmospheric-electric elements has been found that can be attributed, without question, to nuclear explosions during the period studied. *Subject Headings:* **1. Atmospheric electricity 2. Potential gradient. I. Carnegie Institution of Washington. Dept. of Terrestrial Magnetism II. Contract AF 19(604)-251.**—*Authors' abstract.*

6.3–363 551.594:550.384.4

Wasserfall, K. F., **Diurnal Sq-variation and overhead current-system, July 1933.** *Journal f Geophysical Research*, 51(1):1–20, March 1953. 13 figs., 4 tables, 2 refs., 3 eqs. **DWB**—n 1937, the author published a paper entitled **"Studies on the quiet diurnal variation of magetic elements"** [See 1 of "References" at end of paper], giving results of an analysis based rincipally on records at Tromsö, Dombås, and Rude Skov, supplemented by data for Sitka nd Godhavn. The relation between the magnetic diurnal variation and the dynamo theory -first suggested by A. SCHUSTER and later worked out by SYDNEY CHAPMAN and J. BARTELS 2]—was discussed. Analysis based on so few stations could not be satisfactory but the results eemed so promising that an analysis based on data collected during the Second International olar Year of 1932–33 appeared justified. DR. LA COUR kindly supplied all publications and opies of records for 44 stations situated in the Northern Hemisphere. The analysis, begun n 1939, had to be discontinued during World War II. It was resumed in 1946. The present aper gives a descriptive study of the solar daily magnetic variation for the month of July 933. The magnetic field pattern for the Northern Hemisphere, from data obtained at the 4 stations of the Second International Polar Year, is deduced with good coverage in north olar regions. An atmospheric current-system, which would produce the observed field, is erived. Changes in field dependent on Universal Time are neglected. *Subject Headings:* **. Geomagnetic variation 2. Atmospheric electricity 3. International Polar Year, 1932–1933.** *-Author's abstract.*

6.3–364 551.594.11:551.513.2:551.557

*Falconer, Raymond E., **Correlation between atmospheric electrical activity and the jet tream.** *General Electric Research Laboratory, Schenectady, N. Y., Report*, No. RL-900, uly **1953.** 29 p. 14 figs., 7 tables, foot-refs. Photostat. **DWB**—Systematic files of ontinuous and synchronized records from meteorological instruments installed at the G.E. ab. at Schenectady, N. Y., are available (in most cases) for each day since 1948. The ecords include temperature, relative humidity, precipitation, pressure, wind, solar radiation, ght of northern sky, long wave (night-time), outgoing radiation, precipitable water of entire tmosphere, electrical potential gradient, condensation nuclei count and salt particle count. he present study shows these instruments and records, and data from a correlation between roximity of jet stream to Schenectady (for Oct. 1952 through Feb. 1953) as shown on U. S. eather Bureau 200, 300 and 500 mb charts and electrical activity as recorded by radioactive llector on fair days. When this current exceeded +0.05 microampere for several hours a t stream was found within 250 miles of Schenectady on 42 days out of 50, or 80% of the time. heory is that a high positive charge is carried into region by jet stream from storm areas pstream. *Subject Headings:* **1. Jet stream electrical effects 2. Jet stream analysis 3. Poential gradient 4. Schenectady, N. Y.**—*M.R.*

6.3–365 551.594.11:551.557

Graystone, P., **Atmospheric electricity and jet streams.** *Meteorological Magazine*, ondon, 83(989):347, Nov. **1954.** ref. **DWB**—Theory of R. E. FALCONER that high positive otential gradient near surface may be associated with jet stream was tested at Lerwick, but o significant correlation was found. *Subject Headings:* **1. Potential gradient 2. Jet stream.**—*.E.P.B.*

6.3–366 551.594.12:551.510.535:621.396.81

De Voogt, A. H., **The calculation of the path of a radio-ray in a given ionosphere.** *Initute of Radio Engineers, New York, Proceedings*, 41(9):1183–1186, Sept. **1953.** 5 figs., refs., 14 eqs. **DWB**—A third degree function is presented giving in a hypothetical way the ectronic density in the ionosphere as a function of height or distance to the earthcenter: by serting appropriate values of the constants, in accordance with measured values from ionoheric sounding stations, it is possible to arrive at any desired or proposed form of distribution CHAPMAN, HACKE), though there is no physical base for this third degree curve given in this aper. This function allows, after substitution, to calculate exactly, i.e., without any approximation, traveling-time, maximum height, and distance on the earth's surface reached by a dio-ray radiated at a given angle. Briefly, the calculation of the ray-path in an ionosphere

based on measured values and heights of ionization-maxima at the ionospheric stations and based on arbitrarily selected values of gradients is shown to be possible. *Subject Headings* **1. Ionospheric ionization 2. Radio wave propagation.**—*Author's abstract.*

6.3–367 551.594.12:551.510.535:523.74(

Ghosh, Mrinmayee (*Univ. of Calcutta*), **On the comparative increases of the F1 and F2 ionizations from Sunspot minimum to sunspot maximum.** *Journal of Geophysical Research* 58(1):41–51, March **1953.** 4 figs., table, 13 refs., 9 eqs. **DWB**—Ionospheric records show that between the epochs of sunspot minimum and sunspot maximum the ionization of the *F* region increases by a much larger factor than the ionizations of the *E* and *F*1 regions (by a factor of about 3 for *F*2 maximum and a factor of about 1.6 for the *F*1 maximum). This anomaly can be explained by a proper consideration of the current hypothesis, there is only one ionizing radiation (ionizing atomic oxygen) for the composite *F* region. *F*1 is formed at a height where the rate of ion production is maximum, by the usual Chapman process, and another bank of ionization with greater ionization density appears at a greater height, as a result of rising temperature and falling (effective) recombination coefficient above *F*1 maximum. In the present paper, the ionization distribution of the composite *F* region with height is calculated with the help of the formulas derived recently by A. P. Mitra in a paper in which this hypothesis has been discussed. It is found that a comparatively small increase in *F* ionization (due to an increase in the ionizing radiation) leads to a much larger increase in the *F*2 ionization. The increase of *F*2 ionization from sunspot minimum to sunspot maximum as calculated, is found to agree well with that as observed. *Subject Headings:* **1. Ionizatio 2. Ionospheric structure 3. Sunspot cycle.**—*Author's abstract.*

6.3–368 551.594.12:551.510.53

King, G. A. M., **Electron distribution in the ionosphere.** *Journal of Atmospheric and Terrestrial Physics*, 5(4):245–246, Sept. **1954.** fig., 2 refs., eqs. **DWB**—A simplification is given of J. M. Kelso's method of calculating gradients of electron density and therefore true height of a given electron density. *Subject Headings:* **1. Electron density 2. Ionosphere I. Kelso, J. M.**—*C.E.P.B.*

6.3–369 551.594.12/3:551.510.5

Sagalyn, Rita Callahan and Faucher, Gerard A., **Aircraft investigation of the large ion content and conductivity of the atmosphere and their relation to meteorological factors.** *Journal of Atmospheric and Terrestrial Physics*, 5(5/6):253–272, Nov. **1954.** 13 figs., table, 14 refs., 5 eqs. **DWB**—Continuation of *item* 4.9–256, Sept. 1953, *MAB*. Aircraft observations of conductivity, large ion content, temperature and humidity at 700–15,000 ft show a "exchange" surface layer 1000–10,000 ft thick (average 6000) over continents in fair weather. Vertical distribution of large ions depends on turbulence; at upper boundary of layer, temperature gradient decreases sharply. In transition layer about 800 ft deep, conductivity (small ion content) increases 1½ to 6 times and large ion content decreases by a factor of 1½–100 to about 200 per cc. Exchange layer is same as friction layer in which small ions are removed by collision with nuclei. It is thinner over mountains. It contributes 40–73% of total columnar resistance. Ratio N_+/N_- averages near unity. At constant altitude large ion concentration increases and conductivity decreases with increasing humidity. *Subject Headings:* **1. Ioniza tion 2. Conductivity 3. Troposphere.**—*C.E.P.B.*

6.3–370 551.594.1

Coroniti, Samuel C. and Heaton, Eldon (*Air Force, Cambridge Res. Center, Cambridg Mass.*), **The electrical conductivity of the atmosphere over the Pacific Ocean.** *America Geophysical Union, Transactions*, 34(6):833–835, Dec. **1953.** fig., table, 5 refs., eq. **MH-Bl** —The electrical conductivity of the atmosphere was measured over the Pacific Ocean. Th measurements were made at altitudes of 3.8, 5.2 and 6.4 km and between geomagnetic latitude of 22°N and 45°N. The value of q computed from the measured conductivity values agre very well with those derived from cosmic-ray data. *Subject Headings:* **1. Electrical conductivit of air 2. Pacific Ocean.**—*Authors' abstract.*

6.3–371 551.594.13

½Holzer, Robert Edward and Schilling, G. F. (*Calif. U. at L. A.*), **The mean diurnal variation of air-earth current density at selected stations in Southern California.** California. University at Los Angeles, Institute of Geophysics, Contract AF 19(122)-254, Scientific Report, No. 1, March 10, 1952. 9 p. 7 figs., 2 refs. **DWB**—Preliminary results (in curves) of about six months observations are analyzed and discussed. Several interesting features, although not conclusive, are stated. Ocean stations may have persistent local diurnal variations of much smaller amplitude than the land stations. A superior observing site for world-wide effects would comprise: location of the instruments several meters above the ground of the elevated portion of an island near 30° latitude where the weather would be dominated by semi-permanent high pressure area. *Subject Headings:* **1. Air-earth current. I. California. Univ. at L. A. Institute of Geophysics II. Contract AF 19(122)-254.**—*W.N.*

6.3–372 551.594.13:551.510.53

McDonald, James E. (*Iowa St. Coll. Dept. of Physics, Ames*), **On the electric conductivity of the lower stratosphere.** *American Geophysical Union, Transactions,* 34(4):529–533, Aug. 1953. 14 refs. **MH-BH**—There are only a few measurements available for the electrical conductivity of the stratosphere, which suggest a decrease with height. A quantitative estimate of the convective transport of Aitken nuclei by thunderstorm cells is made, using LANDSBERG's data on the vertical distribution of nuclei in the troposphere. The result is 6×10^{19} nuclei sec^{-1} for the whole world or 10 nuclei cm^{-2} sec^{-1}. The rate of fall-out of nuclei is 2 nuclei cm^{-2} sec^{-1}. LETTAU's data for the diffusion coefficient suggest a downward transport of 10^3 cm^{-2} sec^{-1}. Hence thunderstorms cannot account for the total upward transport of nuclei. *Subject Headings:* **1. Electrical conductivity of air 2. Stratosphere 3. Nuclei.**—*A.A.*

6.3–373 551.594.221:551.508.94

Stekol'nikov, I. S., **Vysokovol'tnyĭ razriad i grozozashchita.** [A high voltage discharge and thunderstorm protection.] *Priroda,* Moscow, 42(4):19–30, April 1953. 4 figs. **DLC**—A detailed study of the problem. The gradual development of the dynamics of high voltage lightning discharges and their consecutive stages—corona, leader, main channel, arc, long spark; rational application of lightning discharges in technology; effective control of their harmful effects on aviation and radio transmission as developed in various high voltage laboratories, especially in the Laboratory of High Voltage Gas Discharge of the Energy Institute of the Academy of Sciences, are described. Descriptions of new instruments and appliances such as: recorder of lightning voltage, enabling one to get information on the nature of lightning discharges; electronic oscillograph for the registration of various stages of lightning rods and their application conclude the article. *Subject Headings:* **1. Lightning discharges 2. Lightning recorders 3. Electronic oscillographs 4. Lightning rods.**—*A.M.P.*

6.3–374 551.594.51

Pillow, M. E., **Intensity distribution among nitrogen bands in the auroral spectrum.** *Royal Society of London, Proceedings, Ser. A,* 67(9):780–788, Sept. 1, 1954. 4 figs., 6 tables, 1 refs. **DWB**—The factor $p=[\int\psi_{v'}\psi_{v''}\,dr]^2$, occurring in transition probabilities between vibrational levels, has been calculated for a number of transitions of nitrogen molecules. Intensities obtained from these values have been used to investigate the distribution of intensities among bands in auroral spectra. *Subject Heading:* **1. Auroral spectra.**—*Author's abstract.*

PART II. ANNOTATED BIBLIOGRAPHY ON STORM SURGES

By: *Mollie P. Kramer*

INTRODUCTORY NOTE

This is the fourth in a series of bibliographies on Marine Meteorology and Climatology. The Third—on **Wind Waves and Swell,** appeared in the Vol. 5, No. 11 (Nov. 1954) issue of *Meteorological Abstracts and Bibliography.* The other two were in the issues for Sept. 1953 (**Marine Meteorology and Climatology of Pacific**) and Jan. 1954 (**General Oceanographic Meteorology**).

The methods of predicting storm surges, both for tropical and extratropical cyclones, have been worked out in great detail for nearly half a century. The catastrophic storm of Jan. 29–Feb. 2, 1953 on the North Sea Coasts of Holland, Belgium and England, however, called special attention to the need for even more accurate predicting than has heretofore been thought possible. At least 20 papers on various aspects of that storm are included in this bibliography (see outline below) and many more are yet to come.

The hurricane tides of the New England hurricanes of 1938 and 1954 did almost as much damage as was experienced in the North Sea storm of 1953, though loss of life was not as great. This phenomenon is, however, somewhat different and will be treated as one of the aspects of Tropical Storms in bibliographies on that important subject area of meteorology. Only half a dozen of the hundreds of such articles which might have been considered for this bibliography were selected for inclusion herein.

Destructive storm surges may be anticipated when a rare combination of gales at sea (with an unusually long fetch), high solar-lunar tides, and possibly resonance effects (seiches) occur in the particular basin or sea, and at locations where coastal orography, depth and bottom or beach topography are peculiarly favorable for amplification of any surges which may occur in the open sea. Dikes and other protective structures are usually adequate for storms that occur once in 10 years but rarely are sufficient to protect against the 50–500 year storms. The 1953 storm was just such a 500-year storm which, though barely overlapping the existing seawalls, was able to inundate vast areas by attacking the soft rear side of the dikes, causing numerous breaks in or collapse of these structures. Of course even a minor storm surge will cause destruction of flimsy beach cottages, but that is a yearly occurrence at some place or another.

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  - 1920–1938, 6C–35
- Specific storms
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  - Nov. 13, 1894 (England), 6C–2
  - Nov. 9, 1904 (North Sea), 6C–5
  - Jan.–Feb., 1916 (England, Germany, North Sea), 6C–8, –9, –17
  - Nov. 1917 (England), 6C–17
  - Dec.–Jan., 30–1, 1921–1922 (England), 6C–17
  - Sept. 23, 1924 (Finland), 6C–88
  - Jan. 1928 (England), 6C–34, –39
  - July 20, 1929 (England), 6C–18
  - Nov. 10–13, 1929 (England), 6C–34
  - Nov. 17, 1930 (Baltic Sea), 6C–33
  - Dec. 13, 1950 (Baltic Sea), 6C–33
  - 1930 (Calif.), 6C–44
  - Sept. 21, 1934 (Japan), 6C–26
  - Oct. 17–21, 1935 (England), 6C–34
  - April 1–15, 1936 (Japan), 6C–63
  - Oct. 18, 27, 1936 (North Sea, Germany) 6C–30
  - Nov.–Dec., 30–2, 1936 (England), 6C–29 –34
  - Nov. 24, 1938 (North Sea, Germany), 6C–6
  - 1939 (Calif.), 6C–44
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  - March 18, 1952 (Gulf of Mexico), 6C–67
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    - (Irish Sea), 6C–69

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GEOGRAPHICAL OUTLINE

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1891

6C–1 551.515:525.63

Engelenberg, E., **Over den invloed van windrichting en luchtdrukking op den zeespiegel.** [On the influence of wind direction and air pressure on sea level.] *Ingenieur*, s'Gravenhage, 6(39):349–352, **1891.** 5 tables. **DLC**—The first critical analysis and correlation of sea conditions to meteorological effect. Author found a direct relationship between sea height and wind direction and between sea height and atmospheric pressure increases. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level.**—*Dubach and Maloney.*

1895

6C–2 551.556:525.63

Wheeler, W. H., **The effect of the gale of the 13th of November on the tides.** *Nautical Magazine*, London, 64:146–48; 353–355; 1041–1042, **1895.** tables. **DLC**—Discussion of local effects of wind and atmospheric pressure on sea level at fourteen ports along the Irish Sea coast, the East coast of England and in the English and Bristol Channels. Mean variation of the tides from calculated heights was 2.7 ft (wind force 6.78; expected mean tide 24.35 ft.). Boston Dock tidal records for 1893–1894 analyzed to isolate wind effects. Forecast method based on Boston Dock relationships suggested for other ports. *Subject Headings:* **1. Storm surges 2. Wind effects on water level 3. Pressure effects on water level 4. England.**

1897

6C–3 551.515:525.63

Ortt, F. L. (*The Hague*), **The effect of wind and atmospheric pressure on tides.** *Nature*, London, 56(1439):80–84, May–Oct., **1897.** **DWB**—One of the earliest attempts to calculate the separate effects of wind on tides. Author contends that the "raising or depressing is proportional to the pressure of wind, and that the advance or retardation in time is proportional to the velocity of wind." *Subject Headings:* **1. Sea level variations 2. Tidal dynamics.**

1902

6C–4 551.556:551.481.1

Henry, Alfred J., **Wind velocity and fluctuations of water level in Lake Erie.** *U. S. Weather Bureau, Bulletin J*, **1902.** 22 p. 2 tables, graphs. **DWB**—Report deals with the character and frequency of storm winds on Lake Erie, the changes in water level produced by them, and the possibility of predicting the occurrence of the most pronounced changes in level at the eastern end of the Lake. *Subject Headings:* **1. Storm surge forecasting 2. Lake Erie 3. Wind effects on water level.**

1904

6C–5 551.515:525.63

van Bebber, W. J., **Sturm vom 8. und 9. November 1904.** [Storm of November 8 and 9, 1904.] *Annalen der Hydrographie und Maritimen Meteorologie*, 32:559–562, **1904.** **DWB**—Account of storm surge of Nov. 9, 1904 in the North Sea. *Subject Headings:* **1. Storm surges 2. North Sea.**

1913

6C–6 551.515:525.63

Abbot, Frederick V., **Effect of storms on tidal levels, and minor irregularities in tidal curves.** *U. S. Corps of Engineers, Professional Memoirs*, 5(21):280–291, May–June **1913.** **DLC**—Author presents "accurately observed and recorded" data to prove his contention that, due to tidal flow, bottom configuration, momentum, specific gravity differences, and barometric pressure, the surface of the ocean as much as 3 miles from the shore is not a plane or simple ellipsoidal surface. *Subject Headings:* **1. Sea level variations 2. Pressure effects on water level 3. Storm surges 4. United States East coast.**

6C–7 551.515:525.63

*Ahlfeld, Wilhelm, **Einfluss von Wind und Luftdruck auf die Höhe des Meeresspiegels.** [Influences of wind and air pressure on heights of the sea surface.] Inaugural-Dissertation, Kiel Universität, **1913.** 33 p. 32 tables, refs. **DWB**—Author first reviews briefly previous works on non-periodic sea level variations in the Baltic sea. Secondly he derives a formula by which water level at Kiel, Friederichsort, Darserot, Arkona can be computed from air pressure and wind. Computations tabulated. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Baltic Sea.**

1916

6C–8 551.515:525.63

*Grossman, Louis Adolf, **Die Sturmfluten an der deutschen Nordseeküste am 13. Januar und 6./17. Februar 1916.** [Storm surges on the German North Sea coast on January 13 and February 6–17, 1916.] *Annalen der Hydrographie und Maritimen Meteorologie*, 44:361–380, **1916.** tables. **DWB**—Account of storm surges of Jan. and Feb. 1916 in the North Sea with accounts of the water level rise and damage at numerous cities along the German coast. *Subject Headings:* **1. Storm surge data 2. North Sea 3. Germany.**

1917

6C–9 551.556:525.63

*§la Cour, Dan (*Danish Met. Inst.*), **Abnorme vandstandsforhold i de danske farvande.** [Abnormal water level in the Danish straits.] *Denmark. Meteorologisk Institut, Meddelelser*, No. 4, 1917. 83 p. 33 figs., 11 tables, charts. **DLC**—Good coverage of the storm of Jan. 15–16, 1916 including weather charts for the 12th through 16th, four-hourly wind and hourly water level data for forty stations in the Kattegat. *Subject Headings:* **1. Wind effects on water level 2. Storm surges 3. Kattegat 4. Denmark.**

1918

6C–10 551.54:551.461.2

Close, Charles, **The fluctuations of mean sea-level with special reference to those caused by variations in barometric pressure.** *Geographical Journal*, 52(1):51–58, July, **1918.** 3 figs., table. **DLC**—In early investigations of meteorological tides the sea was regarded as a vast inverted water barometer and correlations were sought between the fluctuations of sea level at a place and the fluctuations of the barometer. This paper presents a review of investigations of this type to 1918. *Subject Headings:* **1. Storm surges 2. Pressure effects on water level.**

1920

6C–11 551.515.2:525.63

Cline, Isaac Monroe, **Relation of change in storm tides on the coast of the Gulf of Mexico to the center and movement of hurricanes.** *Monthly Weather Review*, 48:127–146, **1920.** 9 figs., 19 refs. **DWB**—A brief summary of what is known bearing directly on the subject concerning wind and waves is given. Hurricanes are in all instances preceded by storm tides. The water commences rising on the coast in front of the cyclonic area, one to two days before the storm is experienced. The wind velocities and directions in different parts of the hurricane, as deduced theoretically, do not meet the requirements in this study to explain the rises in tides. Waves of different sizes are developed in proportion to the winds which prevail in different quadrants of the storm. The largest and longest waves which develop in the right rear quadrant pass through the cyclonic area and move to shore where they cause a rise in the water in front of and on the right of the line over which the center of the hurricane is advancing. Rise begins when the storm surge is 300 to 500 miles distant and varies from 8 to 5 feet above the mean Gulf level. *Subject Headings:* **1. Storm surges 2. Hurricanes 3. Gulf of Mexico.**

6C–12 551.515:525.63

*Meissner, Otto, **Über den örtlichen Einfluss von Luftdruck und Wind auf den Wasserstand der Ostsee.** [On the local influence of air pressure and wind on the water level of the Baltic Sea.] *Annalen der Hydrographie und Maritimen Meteorologie*, 44:473–477, 1916; 45:227–232, 1917; 48:293–296, **1920.** figs., tables, refs. **DWB**—In Pts. I and II the daily values for sea level and for the meteorological elements are compared. In Pt. III the same is done for monthly and annual averages. It is concluded that meteorological conditions exert a considerable influence on the semi-annual water level average but do not significantly affect the annual. *Subject Headings:* **1. Sea level variations 2. Baltic Sea.**

1921

6C–13 551.515:525.63

*Lely, Cornelis Willem, **De invloed van de Zuiderzee op de stormvloedstaden langs de Friesche kust.** [Influence of the Zuider Zee on the storm floods along the coast of Friesland.] 's-Gravenhage, van Langenhuysen, **1921.** 79 p. tables, maps, diagrs. **DLC**—It is shown that the Zuider Zee is responsible for but 20 to 60 cm of the increased water level. The data presented graphically and tabulated are based on analysis of available recordings for the last 30-year period. *Subject Headings:* **1. Storm surges 2. Friesland, Netherlands.**—*W.N.*

1922

6C–14 551.515:551.481.1

*Hayford, John F., **Effects of winds and of barometric pressures on the Great Lakes.** *Carnegie Institution of Washington, Pub.*, No. 317, **1922.** 133 p. 29 tables, 16 plates, 68 eqs. **DWB**—As part of an extensive study of the Great Lakes aimed at better future approximations of outflow, a considerable amount of data on water level variations at various stations has been tabulated and correlated with wind and barometric pressure. Barometric effects on elevation of water surface at a given point found primarily proportional to distance of said point from the center of gravity of the area of the lake surface. Wind effects at a given point found dependent to a small extent on distance of that point from the nodal line. Initial seiche producing impulse in Great Lakes probably more often wind than pressure. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Seiches 4. Great Lakes.**

6C–15 551.515:525.63

Montagne, M., **Le service de la prediction de la houle au Maroc.** [Swell forecast service at Morocco.] *France. Service Hydrographique, Annales Hydrographiques*, Ser. 3, 5:157–184, **1922.** 16 plates. **DN-HO**—On July 1, 1921 a swell forecast service was created at Rabat for the purpose of issuing 18 and 36 hour forecasts for Moroccan ports and navigators at sea, because commercial traffic in Moroccan ports is unusually dependent on the state of the sea. This report summarizes the research and events leading up to the formation of the service, the types, origins and propagation characteristics of the varieties of swell observed in Morocco, and the measurement and forecast procedures used by the service. (*See also:* Gallois, L., **Le phénomène de la houle sur la côte Atlantique du Maroc.** [The swell phenomena on the Atlantic coast of Morocco.] *Annales de Geographie*, 29:462–464, 1920. **DLC.**) *Subject Headings:* **1. Storm surge warning services 2. Morocco.**

1925

6C–16 551.556:525.63

Proudman J. and Doodson, A. T., **Time-relations in meteorological effects on the sea.** *London Mathematical Society, Proceedings*, 2nd Ser., 24:140–149, **1925.** 2 figs., table, 4 refs., 28 eqs. **DLC**—An important contribution to the theory of surges. Solution for the relation between temporary wind stress and the corresponding change of water level in an enclosed sea on the assumption that the sea is a non-rotating and one-dimensional canal. *Subject Headings:* **1. Wind effects on water level 2. Storm surge dynamics.**

1929

6C–17 551.515:525.63

*Doodson, A. T. and Dines, J. S., **Report on Thames floods. Meteorological conditions associated with high tides in the Thames.** *Great Britain. Meteorological Office, Geophysical Memoirs*, 5(47), **1929.** 39 p. figs., tables, eqs., appends., refs. **DWB**—In the first article, by A. T. Doodson, all storms surges for the past 15 years were examined in relation to (a) the types of barometric pressure systems, (b) the position and lines of travel of cyclonic centers, (c) the time relations between the maxima of the storm surge and ordinary tidal oscillations. Wind influence on water in relation to water depth discussed in connection with the preponderance of storm surge occurrences near the time of low tide. Historic surges of Jan. 1916, 1922, and 1928, and Nov. 1917 described. Explanation given for double surges on basis of local and more distant wind effects. In his statistical correlation of sea level and barometric pressure and gradients in three localities author assumes that perturbation of sea level can be represented as a linear function of the atmospheric pressure and its gradient in two directions. Correlation coefficients tabulated. Most effective sea level raising winds for the Norwegian Sea and the Atlantic Ocean south of Ireland determined and time lags discussed. Effects of land water studied in connection with the values of mean sea level for 1925 and found negligibly small. Unrealistic to estimate probability of storm surges directly on basis of frequency of occurrence in the past. Better approximations obtainable through a twofold study of the frequency curves for an undisturbed tide reaching a specified height and for meteorological disturbances reaching a specified amount. In the second article, by J. S. Dines, an attempt is made, by a careful examination of the available data, to draw up a set of rules for forecasting probability of storm surges in the Thames. Seventeen surge cases studied previously by Doodson are tabulated, subdivided by associated wind patterns and illustrated by typical synoptic charts. Derived conditions for forecasting a 4 ft. or more water rise at Southend listed and applicability of the resulting forecast rule tested. Concluded that there is a close association between 60 mph geostrophic, NW or N winds over the North Sea and raised water level at Southend but that forecasts are not yet possible. *Subject Headings:* **1. Storm surge data 2. Storm surge forecasting 3. Southend, England 4. North Sea.**

6C–18 551.515:525.63

Douglas, C. K. M., **The line-squall and channel wave of July 20th, 1929.** *Meteorological Magazine*, 64(764):187–189, 1929. **DWB**—Brief theoretical explanation (after J. PROUDMAN) of the storm surge on the South coast of England originating when an unusually severe line squall was well out to sea. *Subject Headings:* **1. Storm surge dynamics 2. Line squalls 3. South Coast, England.**

6C–19 551.556:525.63

*Gallé, P. H., **Wind en windeffect in de Nordzee, Zuiderzee, Golf van Aden, Golf van Bengalen, en Noord-Atlantischen Ocean.** [Wind and wind effect in the North Sea, Zuider Zee, Gulf of Aden, Gulf of Bengal, and North Atlantic ocean.] *De Zee*, Rotterdam, 51(12):770–782, Dec. 1929. tables. **DLC**—Effects of different wind directions and forces on water level in the North Sea, Zuider Zee, Gulf of Aden, Bay of Bengal and North Atlantic Ocean are tabulated and discussed. Correlation coefficients between wind and water level are derived. *Subject Headings:* **1. Wind effects on water level 2. North Sea 3. Zuider Zee 4. Gulf of Aden 5. Bay of Bengal 6. North Atlantic Ocean.**

6C–20 55:551.543:551.461.2

Proudman, J. (*Liverpool Obs. & Tidal Inst.*), **The effects on the sea of changes in atmospheric pressure.** *Royal Astronomical Society, Monthly Notices, Geophysical Supplement*, 2(4):197–209, Oct. 1929. refs., eqs. **DLC**—A study of the dynamical theory of the motions induced in the sea by the varying atmospheric pressure acting normally on its surface. The rotation of the Earth is taken into account. Friction and wind action are neglected and the fundamental equations used take the same form as in the theory of tides. Three ideal cases are considered: narrow channel with constant depth and currents in one direction; channel in which depth varies from side to side but not from end to end; sea of uniform depth and of unbounded lateral extent with conditions symmetrical about a point. *Subject Headings:* **1. Pressure effects on water level 2. Storm surge dynamics.**

6C–21 551.515:525.63

Yamaguti, Seiti, **On the effect of cyclones upon sea level.** *Tokyo. Imperial University, Earthquake Research Institute, Bulletin*, 7(1):115–131, June 1929. 6 figs., 5 refs., table. **DLC**—In a previous paper (Terada, T. and Yamaguti, S., *Imperial Academy of Japan, Tokyo, Proceedings*, 4(8), 1928, **DLC**) the relationship between the monthly frequency of cyclonic tracks visiting the Japanese coast and sea level at Aburatubo was investigated. In this paper the author extends that investigation to include Hososima, Hanasaki and Wazima using the daily variation of cyclones in the North Pacific for purposes of correlation. *Subject Headings:* **1. Pressure effects on water level 2. Storm surges 3. Japan 4. North Pacific.**

1932

6C–22 551.556:551.461.2

Palmén, Erik, **Über die Einwirkung des Windes auf die Neigung der Meeresoberfläche.** [On the influence of wind on the inclination of the sea surface.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 6(14), 1932. 50 p. figs., eqs. **DLC**—Known water levels are grouped in certain selected triangles extending over different regions of the Baltic Sea according to the mean wind prevailing within the respective triangles. Primary declivity values are corrected by eliminating static effect of atmospheric pressure, influence of currents, and the rotation of the earth. It is found that the pure effect of the wind is inversely proportional to the depth of the sea and a square function of the wind velocity. An empirical formula for wind induced declivity is worked out for the Bothnian Sea at a mean depth of about 70 m. Tangential stress and the coefficient of friction are found to be functions of wind velocity. A number of specific results pertaining to the heaping up of the water in certain pelagic regions, directly or indirectly caused by the wind, are included. *Subject Headings:* **1. Wind effects on water level 2. Wind stress 3. Gulf of Finland 4. Gulf of Bothnia.**

6C–23 551.515:525.63

*Sekiguti, Rikiti, **Statistical investigation of the effect of wind and air pressure on the height of sea level at some tidal stations of Japan.** *Geophysical Magazine*, Tokyo, 6:123–145, 1932. 4 figs., 10 tables, eqs. **DWB**—Relations of daily mean height of sea level at Kusimoto to winds and air pressure are investigated by wind directions. Different results achieved when data were treated first using deviations from the normals and second the successive differences. Suggested that meteorological effects manifest themselves in different forms according to the difference of types of barometric distribution and of its mode of change. The barometric factor, if determined by noting

only the local meteorohydrographic relations, is of very ambiguous meaning. No attempt made to separate wind and pressure effects. *Subject Headings:* **1. Sea level variations 2. Kusimoto, Japan.**—*From author's summary.*

6C–24 551.54:525.63

Stenij, S. E., **Zur Theorie der Wasserschwingungen in einem begrenzten Meeresbecken mit besonderer Berücksichtigung des Einflusses vom Luftdruck.** [On the theory of water oscillation in an enclosed ocean basin with particular consideration of the effect of air pressure.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae,* 6(16):1–78, **1932.** 7 figs., bibliog. p. 75–78, 135 eqs. **DLC**—The paper is an attempt to determine mathematically whether it is possible that certain water level fluctuations result from air pressure variations. The author summarizes briefly previous studies made on the subject. The body of the work consists of Pt. I on the oscillation of water in an enclosed, non-rotating basin and Pt. II on the computation of longitudinal water oscillation in a narrow ocean basin. *Subject Heading:* **1. Pressure effects on water level.**

1933

6C–25 551.515.2:525.63

Cline, Isaac Monroe, **Tides and coastal currents developed by tropical cyclones.** *Monthly Weather Review,* 61(2):36–38, Feb. **1933. DWB**—"Storm tides which build up on the coast in the right-hand front of a hurricane result from the storm swells from winds in the right rear quadrant" and are the storm's greatest destructive agency and outstanding indicators of its intensity and direction of movement. Storm tides sometimes detected as much as three days in advance of the storm. Historical instances cited. Destructive force of currents caused by storm swell and running from left to right across the right front hurricane quadrant described. *Subject Headings:* **1. Storm surges 2. Hurricanes 3. Gulf of Mexico.**

1935

6C–26 551.515.2:525.63

Hidaka, Koji, **Change of water level in an enclosed sea due to a temporary wind.** *Geophysical Magazine,* Tokyo, 9(3/4):279–284, **1935.** 3 figs., 14 eqs., 3 refs. **DWB**—An investigation of the relation between the temporary wind stress and the corresponding change of water level in an enclosed sea containing part of the numerical results obtained in a study of the high water level in Osaka Bay associated with the Muroto typhoon, Sept. 21, 1934. (For an analytical solution of the same problem with the result given by the integral equation of Volterra type, see *Idem,* 7:233–244, 1933.) *Subject Headings:* **1. Storm surge dynamics 2. Typhoons 3. Osaka Bay, Japan.**

6C–27 551.515:525.63

†*Schultze, Edgar, **Die nichtperiodischen Einflüsse auf die Gezeiten der Elbe bei Hamburg.** [The non-periodic influences on the tides of the Elbe at Hamburg.] *Archiv der Deutschen Seewarte,* Hamburg, 53(5), **1935.** 68 p. 14 tables, 72 refs., eqs., 18 plates. **DWB**—Describes a method for deriving wind pressure at the mouth of the Elbe from air pressure at Yarmouth and Tynemouth, England and Blavandshuk, Denmark. *Subject Headings:* **1. Pressure effects on water level 2. Wind effects on water level 3. Hamburg, Germany.**

1936

6C–28 551.515.2:525.63

Hirono, T., **The tsunamis caused by typhoons in Tokyo Bay.** *Meteorological Society of Japan, Journal,* 2nd Ser., 14(7):348–369, July **1936.** In Japanese; English abstract p. (62). **DWB**—Author found that tidal waves do not occur until high tides caused by astronomical tide, accumulation of sea water caused by air pressure, waves caused by winds, and the "dynamic suctional" movement of sea water caused by low atmospheric pressure all act simultaneously. Contends that the tsunamis are lateral oscillations of Tokyo Bay. *Subject Headings:* **1. Tsunamis 2. Typhoons 3. Tokyo Bay, Japan.**—*Burns, Berthelf and Bates.*

1938

6C–29 551.515:525.63

*Carruthers, J. N., **The Horsey floods of February, 1938. Current and wind at the time as observed aboard certain lightvessels.** *Meteorological Magazine,* 73:86–93, May **1938. DLC**—Wind and current data from six lightships in the English Channel and the North Sea are studied to see what light they throw on the storm surges of Feb. 1938 along the Norfolk coast of England. *Subject Headings:* **1. Storm surges 2. Norfolk, England 3. North Sea 4. Ocean currents.**

6C–30 551.515:525.63

Scherhag, R., **Die Nordsee-Orkane vom 18 und 27 Oktober 1936.** [The North Sea hurricanes of October 18 and 27, 1936.] *Annalen der Hydrographie und Maritimen Meteorologie*, 66(1):18–32, **1938.** 9 tables. **DWB**—Account of the very similar and unusually severe North Sea storms of Oct. 18 and 27, 1936, in which maximum wind velocities were not recorded until 12 hours after the passage of the cold front. Combined effects of spring flood tide, regular high water and peak winds from the WNW produced severe storm floods in the Oct. 18th storm. *Subject Headings:* **1. Storm surges 2. North Sea storm (1953) 3. Germany.**

1939

6C–31 551.515.2:525.63

Terada, K., **On "tsunamis" or destructive sea waves excited by a travelling typhoon.** *Kobe, Japan. Imperial Marine Observatory, Memoirs*, 7(2):209–230, July **1939.** 8 figs., tables, 17 eqs., refs. **DLC**—In Pt. I the theory of seiches in a bay or lake excited by a travelling agency (e.g., typhoon) is treated mathematically, and in Pt. II the theory is applied to the bay of Osaka (where "tsunami" excited by the "Muroto" typhoon caused severe damage in 1934.) *Subject Headings:* **1. Tsunamis 2. Typhoons 3. Storm surges 4. North Pacific Ocean 5. Osaka, Japan.**

1941

6C–32 551.556:551.481.1

Hellström, B., **Wind effect on lakes and rivers.** *Ingeniörsvetenskapsakademiens, Stockholm, Handlingar*, No. 158, **1941.** 191 p. 94 figs., 17 tables, refs., 174 eqs. **DN-HO**—A doctoral dissertation covering the effects of barometric pressure, wind effect with viscous and turbulent motion, wind effect on lakes and shape of water surface, wind effect in stratified fluids, laboratory experiments, wind force, the Lake Okeechobee Project, wind effect on rivers and canals and civil engineering with regard to wind effect. *Subject Headings:* **1. Wind effect on water level 2. Lakes 3. Rivers.**

1944

6C–33 551.515:525.63

Hela, Ilmo, **Über die Schwankungen des Wasserstandes in der Ostsee mit besonderer Berücksichtigung des Wasseraustausches durch die dänischen Gewässer.** [On the fluctuations of the water level in the Baltic Sea with special emphasis on the flow through Danish waters.] *Finland. Merentutkimuslaitos, Julkaisu*, No. 134, **1944.** 108 p. 25 figs., 69 refs., 11 tables, eqs. **DWB**—Ch. V (p. 64–93) considers the relationship of water level in the Baltic Sea and flow through Danish waters to atmospheric pressure distribution and wind. The specific high water level cases of Nov. 17, and Dec. 13, 1930 and related synoptic patterns are discussed. *Subject Headings:* **1. Storm surge synoptic conditions 2. Wind effects on water level 3. Baltic Sea.**

1947

6C–34 551.515:525.63

Doodson, A. T., **Storm Surges.** *International Hydrographic Review*, Monaco, 24(42):180–128, **1947.** 13 figs., eqs. **DLC, DN-HO**—Author emphasizes the necessity for detailed examination of the mode of generation of storm surge effects, whether local or far off. He reviews findings of Doodson (6C–34), Proudman and Doodson (6C–16) and Corkan (6C–36, 6C–37). From the wealth of material provided by Corkan a few typical cases are considered to illustrate the principal types of oscillation. In each case, the charts show the meteorological situation, together with storm surge curves at Dunbar and at Southend and the calculations from the formulas for the meteorological tide. *Subject Headings:* **1. Storm surge synoptic conditions 2. Storm surge forecasting 3. England.**

6C–35 551.515:525.63

†*Schalkwijk, W. F., **A contribution to the study of storm surges on the Dutch coast.** *Netherlands. Meteorologisch Instituut, Mededeelingen en Verhandelingen, Serie B*, 1(7), **1947.** 111 p. 46 figs., 38 tables, 72 refs., 5 eqs. **DWB**—This report comprises the results of an attempt to improve the method of prediction of storm surges used by the Netherlands warning system. A survey of the most important investigations concerning this problem leads the author to believe that results of previous methods only hold for the average of a great number of cases and do not serve as a satisfactory basis for the forecasting of the individual storm surge. A theoretical investigation of the influence of wind at different places in the North Sea is carried out and the phenomena of inertia (oscillations, time-lag) studies. A quadratic law for the wind effect as a function of the wind velocity for the entire North Sea is derived. Theoretical considerations serve then to work up the compiled data (1920–1938). Agreement between theoretical and empirical sea level values are compared for the cases of homogeneous fields of wind, depressions, and nonstationary states. New wind effect,

angular distribution and time lag values compared with the results from previous investigations. Discussion of the actual forecast method includes explanations of the superposition of meteorological effect on tides, phenomena of inertia, relation between wind effect and wind direction, effects of atmospheric pressure, distant effects, and differences in the meteorological effect between places along the coast. The last chapter is devoted to wind effect on the East-Scheldt, an example of the wind effect caused in the estuaries which break the Dutch coastline. Extensive charts, tabulated data and references. *Subject Headings:* **1. Storm surge forecasting 2. Storm surge data 3. Holland 4. North Sea.**

1948

6C–36 551.515:525.63

Corkan, R. H., **Storm Surges.** *Dock and Harbour Authority*, London, 28(328):266–271, Feb. **1948. DN-HO**—Present position concerning accurate prediction of tides; results of investigation carried out by A. T. DOODSON, Deputy Director, Liverpool Observatory and Tidal Institute, with reference to storm effects; magnitude and some characteristic features of meteorological tide at Southend; internal forces involved in generation of storm effects; storm surges and how they are generated. *Subject Headings:* **1. Storm surge dynamics 2. Storm surge forecasting. I. Doodson A. T.**—*Engineering Index Service.*

6C–37 551.515:525.63

§*Corkan, R. H., **Storm surges in the North Sea.** Birkenhead, Eng., Liverpool Observatory and Tidal Institute, **1948.** 2 v. *Great Britain. Hydrographic Office, H.O. Misc.*, 15072. figs., tables, charts, eqs. **DWB**—An outstanding and very well illustrated compilation of tidal observations (1928–1938), synoptic conditions and case histories of North Sea storm surges. Pt. I devoted to observational data and their reduction: Pt. II, Sec. I to the theory of storm surges and related phenomena; Sec. II to analysis of storm surges at Southend; Sec. III to prediction of storm surges at Southend; Sec. IV to surge types; and Sec. V to estimates of probability. (*See also:* BROOKS, C. E. P. and GLASSPOOLE, J., **British floods and droughts.** London, Benn, **1928.**) *Subject Headings:* **1. Storm surge dynamics 2. Storm surge forecasting 3. Storm surge data 4. Storm surge synoptic conditions 5. Southend, England 6. North Sea.**

6C–38 551.556:551.461.2

Hela, Ilmo, **On the stress of the wind on the water surface.** *Geophysica*, Helsinki, 3:146–161, **1948.** 13 figs., 3 tables, 10 refs., 10 eqs. **MH-BH**—Graph shows frequency (duration percentage) of the rates of water level variations on the Finnish coast. Rates of water level variations at other points can be calculated by interpolation. The automatic recording Renqvist-Witting tide gage is illustrated and described. Effect of wind and atmospheric pressure on water level is analyzed. An empirical formula is derived by means of which the slope of the sea surface can be determined from the wind velocity and the depth of the sea area, especially for the case where the depth is considerably less than the frictional depth. (*Same item as* 11–110, Nov. 1950, *MAB.*) *Subject Headings:* **1. Storm surges 2. Wind stress 3. Tide gages 4. Finland.**—*I.L.D.*

1949

6V–39 551.515:525.63

§Corkan, R. H., **Storm surges; their importance in modern tidal science and some results of a recent investigation.** *Marine Observer*, 19(143):18–33, Jan. **1949.** 6 figs. **DWB**—From predictions of pressure distribution over the North Sea and continuous tidal observations near the northern entrance, storm surge predictions for Southend are possible. Short period oscillations remain a problem. Discussion includes the magnitude and some characteristic features of the meteorological tides at Southend, storm surge generation, surges in the North Sea (with synoptic charts), surges at Southend, and specific historic illustration. *Subject Headings:* **1. Storm surge synoptic conditions 2. Storm surge forecasting 3. Southend, England 4. North Sea.**

6C–40 551.509:551.461.2:06

Dietrich, Günter, **Ebbe und Flut des Weltmeeres.** [Ebb and flow of the oceans.] *Umschau*, Frankfurt a. M., 49(22):677–679, Nov. **1949.** 3 figs., 2 refs. **DLC**—Ebb and flow of tides are analyzed as to originating forces. Semi-diurnal variations of tides are represented on a world map. Pointed out that the German Hydrographic Institute maintains a regular tide warning system particularly valuable in forecasting swell originating in storms. (*Same item as* 3.7–64, July 1952, *MAB.*) *Subject Headings:* **1. Storm surge warning services 2. Tidal dynamics 3. German Hydrographic Institute.**—*G.T.*

6C–41 525.6

*Hamburg. Deutsches Hydrographisches Institut, **Gezeitentafeln für das Jahr 1950.** [Tide tables for 1950.] Hamburg, **1949.** 207 p. almost entirely tables. **DLC**—A short discussion of

wind and pressure effects on the tides is included in each annual edition of tide tables. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Tide tables.**

6C–42 551.54:525.63

Tomczak, Gerhard, **Ein Beitrag zur Frage des Luftdruckeinflusses auf den Wasserstand an der Küste.** [A contribution to the problem of the influence of air pressure on sea level along the coast.] *Deutsche Hydrographische Zeitschrift*, 2(4):130–133, Aug. **1949.** 3 figs., 5 refs., English and German summaries p. 130. **DLC**—A particular weather situation is discussed with regard to the influence of atmospheric pressure on the water level along the coast. It is pointed out that the customary method of correlating the variations of sea level with the fluctuations of atmospheric pressure can lead to false results. The great differences between the factors which have been derived by various authors are probably due to this circumstance. *Subject Heading:* **1. Pressure effects on water level.** —*A.A.*

1950

6C–43 551.515:551.461.2(484.9)

Corkan, R. H., **The levels in the North Sea associated with the storm disturbance of 8 January 1949.** *Royal Society of London, Philosophical Transactions, Ser. A, Mathematical and Physical Sciences*, 242(853):493–525, July 4, **1950.** 10 figs., 6 tables, 10 refs., eqs. **DWB**—A study of water movements in the North Sea and the way in which they were produced during a storm on Jan. 8, 1949. Observations on hourly heights of tides were made at stations in Great Britain and in the North Sea from Jan. 6 to 10, 1949. Data are presented on hourly values of sea level disturbances, maximum disturbances around the English coast and in the Thames and Humber estuaries, progression of maximum disturbance and of the diurnal tide, meteorological conditions over England and the North Sea during the storm and changes in average levels over the North Sea. Maps of isopleths of equal number of disturbances in the North Sea have been drawn and compared with simultaneous meteorological conditions. Estimates of frictional constant have been made. It is concluded that storm surges of external origin, which could not be explained by wind action, may be the direct result of a previous outflow of water from the North Sea produced during a surge when the sea level was lowered, and that the damping observed in disturbed tide at Southend may be due to a reflection from the German bight which arrives near the time when lowest levels are expected. (*Same item as* 2.4–77, April 1951, *MAB.*) *Subject Headings:* **1. Storm surge dynamics 2. Energy exchange ocean-atmosphere 3. North Sea 4. England.**—*I.L.D.*

6C–44 551.515.2:551.46(794)

Horrer, Paul L., **Southern Hemisphere swell and waves from a tropical storm at Long Beach, California.** *U. S. Beach Erosion Board, Bulletin*, 4(3):1–18, July **1950.** 9 figs., table, 5 refs. **DGS**—The meteorological conditions producing wave action which destroyed or damaged breakwaters in the Long Beach area in 1930 and 1939 are analyzed and presented. Wave heights of 15 and 18 ft were measured by U. S. Engineers and 32 to 39 ft by U. S. Navy observers in the aircraft carrier "Lexington" during the Sept. 1939 storm. Such conditions occur very rarely. (*Same item as* 41–206, Sept., 1953, *MAB.*) *Subject Headings:* **1. Storm surge synoptic conditions 2. Tropical cyclones 3. Ocean wave height 4. Long Beach, California.**—*M.R.*

6C–45 551.515.2:551.461.2

Leppik, Egon, **Die Sturmfluten in der Elbemündung in der ersten Hälfte des 20. Jahrhunderts.** [Storm surges in the Elbe estuary in the first half of the 20th century.] *Deutsches Gewässerkundliches Jahrbuch, Besondere Mitteilungen*, Hamburg, No. 1, **1950.** 2 v. 95 figs., 6 tables, 13 refs. **DWB**—The theoretical and meteorological aspects of cyclonic storms in the North Sea area and of storm tides are taken up in detail, followed by a discussion of 40 cases of storm floods in the Elbe region (from Jan. 1901–Dec. 18, 1949). Vol. II gives detailed data for each case and a comprehensive analysis of synoptic conditions, pressure and wind changes, etc. made by means of graphs and charts. (*Same item as* 3.5–157, May 1952, *MAB.*) *Subject Headings:* **1. Storm surge data 2. Storm surge synoptic conditions 3. Elbe Region, Germany 4. North Sea.**—*M.R.*

6C–46 551.515.1:551.461.2

Tomczak, Gerhard, **Die Sturmfluten vom 9. und 10. Februar 1949 an der deutschen Nordseeküste.** [The storm surges of 9 and 10 Feb. 1949 on the German North Sea coast.] *Deutsche Hydrographische Zeitschrift*, 3(3/4):227 240, **1950.** 11 figs., 4 tables, 14 refs. German and English summaries, p. 227–228. **DWB**—The winter of 1948–9 brought numerous storm surges. On Feb. 9–10 tide gages showed water levels up to 2½ m above normal high water at Husum, during passage of a small deep depression across southern North Sea. Surface weather charts are given for 3 hourly intervals, also barograms and pressure-tube anemogram (max. gust at List/Sylt exceeded 40 m/sec). The effect of air pressure and wind masked ordinary tides. A pressure difference of 25 mb between

Yarmouth and Blaavandshuk can raise high water level by 4 m. (*Same item as* 2.1–81, Jan. 1951, *MAB.*) *Subject Headings:* **1. Storm surge synoptic conditions 2. North Sea 3. Germany.**—*C.E.P.B.*

6C–47 551.543:551.461.2

Unoki, Sanae, **On the variation of sea level caused by the variation of atmospheric pressure. (An investigation on meteorological tides in the neighboring seas of Japan-First paper.)** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(9):321–339, Sept. **1950.** 6 figs., 3 tables, 10 refs., 40 eqs. In Japanese; English summary p. 338–339. **MH-BH**—Author calculates phase difference E between a simple harmonic pressure wave and corresponding change of sea level as:

$$\tan E = \frac{1}{4\pi g} \cdot \frac{Tv^2}{h} \cdot \frac{(\lambda^2+h^2)}{h},$$

where T, v are period and velocity of surface pressure. This agrees with observations, confirming assumption that retardation is due to resistance to long sea waves. (*Same item as* 2.10–113, Oct. 1951, *MAB.*) *Subject Headings:* **1. Storm surge dynamics 2. Japan.**—*C.E.P.B.*

6C–48 551.515:525.63

Vanoni, Vito A. and Carr, John H., **Harbor surging.** *Conference on Coastal Engineering, 1st, Oct.* **1950,** *Long Beach, Calif., Proceedings*, p. 60–68. 9 figs., 9 refs. **DN-HO**—Introductory theoretical remarks on the average water particle velocity in a storm surge and associated ship displacement in harbors supercede a discussion of the characteristics of long waves and sources of long period disturbances. The reduction of breakwater gate width and the development of mooring systems which limit the amplitude of ship motion are suggested as remedial measures to combat damage due to surges in harbors. *See also:* California Institute of Technology, **Wave and surge study for the Naval Operating Base, Terminal Island, California.** *Hydrodynamics Laboratory, Publication*, No. 5, 1945. *Subject Headings:* **1. Storm surges 2. Terminal Island, California 3. Apra Harbor, Guam, Marshall Islands.**

1951

6C–49 551.515:525.63

Corkan, R. H., **Further Investigations of North Sea surges. Storm effects in the Irish Sea.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Brussels, August 1951, Reports and Abstracts of Communications*, p. 71–73, 74, August **1951. DWB**—Studies were conducted to determine what water movements in the North Sea were associated with storms and how such movements were produced. Specific examples were examined with the hope of discovering "the important centres and areas of origin of disturbance, the relation between the water gradients and the winds or pressure gradients, the extent of the flow of water into or out of the North Sea, the positions and movements of nodal lines and the effect of the earth's rotation." In the second paper, conclusions regarding sea level variation associated with storms in the Irish Sea are drawn from a detailed study of five specially selected storms during the course of a year. *Subject Headings:* **1. Storm surge dynamics 2. Pressure effects on sea level 3. Wind effects on sea level 4. North Sea 5. Irish Sea.**

6C–50 551.556:551.481.1

Haurwitz, Bernhard, **The slope of lake surfaces under variable wind stresses.** *U. S. Beach Erosion Board, Technical Memorandum*, No. 25, **1951.** 23 p. 7 figs., 4 refs., eqs. **DN-HO**—An investigation of how wind set-up on Lake Okeechobee, Florida, would vary during a hurricane's passage bringing about rapidly changing winds, the direction shifting up to 180°. Author found that forces created by the rotational effect of the wind and water, plus seiche action, must be taken into account as well as the direct wind stress effect if correct values are to be obtained. For analysis purposes the hydrodynamic equations are simplified by integrating over the whole depth of the lake. Rapidity with which lake level adjusts itself to the variable wind found dependent on the seiche period. (For data *see* U. S. Beach Erosion Board, **Wind tides—Lake Okeechobee.** U. S. Beach Erosion Board, Oct. 1951). (*Same item as* 4.2–172, Feb. 1953, *MAB.*) *Subject Headings:* **1. Wind effects on water level 2. Wind stress 3. Seiches 4. Lake Okeechobee, Florida.**—*Freeman and Bates; author's abstract.*

6C–51 551.515.2:525.63

Ichiye, Takashi (*Kobe Marine Obs.*), **On the abnormal high water caused by the typhoon "Jane."** *Japan. Central Meteorological Observatory. Tokyo, Oceanographical Report*, 2(2):191–198, Dec. **1951.** 10 figs., 5 refs., eqs. English summary p. 198. **MH-BH**—The meteorological tides on the coast of the Osaka Bay due to typhoon "Jane" are computed as a forced secondary oscillation of the bay water by the wind stress and pressure variation accompanying the typhoon. (*See also:* TERADA,

T. and YAMAGUTI, S., **On the effect of cyclone upon sea level.** *Imperial Academy of Japan, Tokyo, Proceedings*, 4:478–480, 1928.) *Subject Headings:* **1. Storm surges 2. Wind stress 3. Typhoons 4. Osaka Bay, Japan.**—*From author's abstract.*

6C–52 551.515.21:551.462

Kawabata, Y. and Fujito, M., **Elevation of the sea surface caused by typhoons.** *Meteorological Society of Japan, Journal*, 2nd Ser., 29(2):37–43, Feb. 1951. 5 figs. **MH-BH**—Author determines empirically the height of the upheaval of the sea level caused by an approaching typhoon. Time of maximum upheaval found to coincide in general with the time of lowest barometric pressure at the station, that is when the typhoon center is closest to the station and the N–NE winds are at their peak. Sea level variation due to wind effects found almost negligible for wind forces less than Beaufort 4 but very important for winds exceeding that force. Total elevation is proportional to the difference between the normal barometric pressure at the station in question and the lowest pressure of the typhoon on its track, and is inversely proportional to the shortest distance from the center to that station, to which the typhoon approaches. (*Same item as* 3.4–134, April 1952, *MAB.*) *See also:* SEKIGUTI, R. and YAMAMOTA, M., **The relation between the sea-level and meteorological elements at Mera.** *Meteorological Society of Japan, Journal*, Ser. 2, 6:223–226, 1927. *Subject Headings:* **1. Storm surges 2. Wind effects on sea level 3. Typhoons 4. Japan.**—*From authors' summary.*

6C–53 551.556:525.63

Keulegan, Garbis H., **Wind tides in small closed channels.** *U. S. National Bureau of Standards, Journal of Research*, 46(5):358–381, May 1951. 33 figs., 7 refs., 87 eqs. **DN-HO**—In addition to the generation of waves, a wind produces a mass transport in a body of water resulting in the lowering of the level at the windward side and rise at the leeward side, which is called wind tide or set-up. This paper presents the theoretical background of the two wind effects involved: the surface traction on the water, and the form resistance of the waves. (*See also* his **Hydrodynamic effects of gales on Lake Erie.** *Ibid.*, 50:99–110, 1951.) *Subject Headings:* **1. Wind wave theory 2. Storm surge dynamics 3. Wind stress.**—*From author's abstract.*

6C–54 551.515.2:525.63

Miyazaki, M.; Yoshizawa, H. and Ushioda, T., **Meteorological tides caused by the typhoon "Kezia" along Japanese coasts in the dangerous semicircle.** *Japan. Central Meteorological Observatory, Tokyo, Oceanographical Report*, 2(1):75–86, May 1951. 6 figs., 7 refs., 9 eqs. In Japanese; English summary, p. 86. **MH-BH**—High winds and low pressure of a typhoon plus the water transport associated with the northward translation of the storm system accounted for rises of sea level along Japanese coasts. A maximum rise of 125 cm was the result of enhancement of the typhoon effects by local conditions. *Subject Headings:* **1. Storm surges 2. Typhoons 3. Japan.**

6C–55 551.509:551.465

*Munk, Walter Heinrich, **Ocean waves as a meteorological tool.** (In: **Compendium of Meteorology.** Boston, American Meteorological Society, 1951. p. 1090–1100. 14 figs., 2 tables, 16 refs.) **DWB**—The various methods involving the propagation of ocean surface waves as an aid in weather forecasting are described and their validity examined. These methods are: 1) the height power method applied to visible swell; 2) the frequency spectrum method applied to forerunners of swell and 3) the storm surge method. In a discussion of the third, storm surges are defined as waves with periods greater than swell and less than tides. Height, periods and time of arrival in relation to the heaviest swell and surf are tabulated for five severe storms off the California coast in the spring of 1948. Surges were observed 36 hours before the heavy storm waves. Improved instrumentation needed before storm surge data can provide reliable aid to forecasting. (*Same item as* 4.7–4, July, 1953, *MAB.*) *Subject Headings:* **1. Storm surge data 2. California.**—*I.L.D.*

6C–56 532.59:525.63

Schönfeld, J. C., **Propagation of tides and similar waves.** 'S-Gravenhage, Ministerie van Verkeer en Waterstaat, Staatsdrukkerij-en uitgeverijbedrijf, 1951. 232 p. 118 figs., 12 graphs (fold. in pocket), 12 tables, refs., eqs. **DWB**—An outstanding contribution to the theory of propagation of long waves, including storm surges. Author first tested the various methods for the computation of tides by applying them competitively to a tidal motion, generated and recorded under laboratory conditions. He attempted to extend the methods of LORENTZ and MAZURE to the subordinate harmonic components of a tide and endeavored to arrive at a rigorous definition of travelling harmonic waves. Harmonic analysis found an inappropriate base for a general conception of the propagation of long waves. Exploration of the theory of the characteristics (consideration of elementary impedances) led to the conviction that this theory would provide the real clue to the

understanding of the propagation of long waves. Characteristic conception of wave motion found preferable to the harmonic in the case of non-linear propagation (long waves) and sometimes in the case of linear. (*Same item as* 5.6–5, June 1954, *MAB.*) *Subject Headings:* **1. Long wave propagation 2. Storm surge propagation 3. Hydrodynamics.**—*From author's preface.*

6C–57 551.556:551.461.2

Unoki, Sanae, **On the upheaving effect of stationary and non-stationary winds upon sea level,** Pt. 1. *Oceanographical Magazine,* Tokyo, 3(1):1–16, March **1951.** 4 figs., 6 refs., 75 eqs. Pt. 2, *Ibid.,* 3(2):53–63, June **1951.** 4 figs., table, 5 refs., 21 eqs. (Parts 2 and 3 of his **Investigation on meteorological tides in the neighbouring seas of Japan.**) Pt. 2 also issued in *Meteorological Society of Japan, Journal,* 2nd Ser., 29(10):336–356, Oct. **1951.** *See* 5.5–146, May 1954, *MAB.*) **MH-BH**—Applying the method given by ARAKAWA and YOSHITAKE, the author investigated the effect of the fetch, water depth, wind gradient and latitude on sea level for stationary winds and for non-stationary winds when the wind velocity was increasing exponentially with time. In Pt. 2, further study of non-stationary winds reveals that Coriolis force and direction of wind rotation exert decided influence on sea level. *Subject Heading:* **1. Wind effects on water level.**

1952

6C–58 551.515:525.63

*Bergsten, Folke, **Vattenstandens Varaktighet utmed svenska kusten.** [Variations of water level on the Swedish coast.] *Sweden. Meteorologiska och Hydrologiska Institut, Meddelanden, Serie D,* No. 4, **1952.** 4 tables, 5 figs., foot-ref. *Geografiska Annaler,* 32(3/4):165–178, **1950. DWB**—In Ch. 4 the periodical changes in water stages along the Swedish Coast, including those affected by storms or wind, are analyzed, with graphs and tables to support the analysis. The variation in tide level is clearly greater in winter than in summer, because of the greater storminess in winter. Variations from place to place also appear on the charts. *Subject Headings:* **1. Sea level variations 2. Storm surges 3. Sweden.**—*M.R.*

6C–59 551.515:525.63

Carr, John H. (*Calif. Inst. Tech. Hydrodynamics Lab.*), **Long period waves or surges in harbors.** *American Society of Civil Engineers, N. Y., Proceedings,* v. 78, Separate No. 123, April **1952.** 16 p. 8 figs., table. foot-refs. **DWB**—This paper reports the results of field and model studies of the sources and characteristics of long-period waves in harbors and analyses the subjects of basin resonance and water motions induced by the waves. Long waves are thought to be the result of surf beat (interference of wave trains of different period) at some distant locales. *Subject Headings:* **1. Surf beats 2. Storm surges.**—*From author's synopsis.*

6C–60 551.515:525.63:551.465

Beydon, J., **La methode Gelci pour la prevision de la houle a Casablanca d'apres une étude de J. Beydon.** [The Gelci method of forecasting swell at Casablanca.] *France. Comité Central d'Océanographie et d'Études des Côtes, Bulletin d'Information,* 4(8):311–318, Sept./Oct. **1952.** 12 figs., eqs. **DLC**—A method is described for forecasting swell and storm surge at Casablanca utilizing successive observed or prognosticated weather maps of the North Atlantic and Europe. Rules given for obtaining the evolution of the swell (chiefly as determined by wind) during the interval between two successive synoptic charts. *Subject Headings:* **1. Storm surge forecasting 2. Casablanca. I. Gelci, Robert.**

6C–61 551.515.1:532.59:551.461.2

Goldsbrough, G. R., **A theory of North Sea surges.** *Royal Astronomical Society, Monthly Notices, Geophysical Supplement,* 6(6):365–371, Sept. **1952.** 4 figs., 5 refs., 14 eqs. **DWB**—Hydrodynamic equations are applied to an idealized and slightly simplified form of a synoptic situation isolated by CORKAN (see 6C–49) as the cause of one of the fundamental types (type E) of North Sea surges. In this type a rise of level travels southwards in about 9 hrs from Dunbar to Southend and is always associated with the passage of a depression eastwards across northern entrance to North Sea. There is no preliminary fall and the rise increases in height during its passage. It is not a standing wave. (*Same item as* 4.9–93, Sept. 1953, *MAB.*) *Subject Headings:* **1. Storm surge propagation 2. Storm surge synoptic conditions 3. North Sea.**—*C.E.P.B.*

6C–62 551.556:532.594

Mortimer, C. H. (*Freshwater Biological Assoc., Westmorland, Eng.*), **Water movements in stratified lakes, deduced from observations in Windermere and model experiments.** *International Union of Geodesy and Geophysics. International Association of Scientific Hydrology, Brussels, 1951,* [*Transactions*], v. 3:335–349, **1952.** 6 figs., 3 plates, bibliog. p. 349. **DWB**—Temperature in nine different depths of the Lake Windermere recorded continuously during three months in order to

investigate internal seiches caused by wind disturbances. Results are compared with laboratory experiments on model lakes. *Subject Headings:* **1. Seiches 2. Wind effects on water level 3. Laboratory models 4. Lake Windermere, Great Britain.**—*A.A.*

6C–63 551.515:525.63

*Nakano, M., **On the secondary undulations of tides caused by the cyclonic storm on April 1–5, 1936.** *Pacific Science Congress, 7th, 1949, New Zealand, Proceedings*, 3:87–90. (pub. **1952**) 3 figs. **DWB**—A report of the results of investigation of periods, amplitudes and times of occurrence of conspicuous undulations and secondary undulations April 1–5, 1936 on the Japanese Pacific coast and their relations with meteorological conditions. *(See also Idem, Oceanographical Magazine*, Tokyo, 1(1):13–32, **1949**). *Subject Headings:* **1. Storm surges 2. Storm surge data 3. Japan 4. Pacific Ocean.**

6C–64 551.515:525.63

Tomczak, Gerhard, **Der Einfluss der Küstengestalt und des vorgelagerten Meeresbodens auf den windbedingten Anstau des Wassers, betrachtet am Beispiel der Westküste Schleswig-Holsteins.** [The influence of the shape of the coast and of tidal flats on the piling up of water by the wind, as shown on the coast of Schleswig-Holstein.] *Deutsche Hydrographische Zeitschrift*, Hamburg, 5(2/3):114–131, **1952.** 4 figs., 8 tables, 15 refs. German, English, French summaries p. 114–115. Translation by L. G. Robins available at Hydrographic Office Library, Suitland, Md. **DWB**—A method is described of forecasting the height of storm floods on the North Sea coasts, taking account of wind force and direction, and local peculiarities. The high tides of Nov. 24, 1938, are discussed and the errors of forecasts 1936–1941 summarized. Sea level wind roses are shown in a folding plate. *(Same item as* 4.3–125, March 1953, *MAB.)* For a similar study of the coastal area between Ems and Elbe, *see Ibid.*, 5(5/6):277–284, 1952 *(see* 4.9–145, Sept. 1953, *MAB)*. *Subject Headings:* **1. Storm surge forecasting 2. North Sea 3. Germany.**—*C.E.P.B.*

1953

6C–65 551.515:525.63:77

The battle of the floods; Holland in February, 1953. London, Newman, Neame Ltd., **1953.** Unpaged. photos. **DN-HO**—An excellent photographic coverage of the flood disaster in the Netherlands, 1953. *Subject Headings:* **1. Storm surges 2. Photography 3. North Sea storm (1953) 4. Netherlands.**

6C–66 551.515.1:525.63

Bowden, K. F. and Ovey, C. D., **Storm surges in the North Sea.** *Weather*, 8(3):82–84, 93, March **1953.** fig., 3 refs. **DWB**—Account of causes of tide levels higher than predicted (low pressure, wind drag) with special reference to Feb. 1, 1953. *(Same item as* 4.9–91, Sept. 1953, *MAB.) Subject Headings:* **1. Storm surges 2. North Sea.**—*C.E.P.B.*

6C–67 551.515:525.63

Burns, Robert E.; Bertholf, Lloyd B. and Bates, Clark C., **The oceanographic and meteorological aspects (of the storm surge) of March 18, 1952 along the Gulf Coast.** U. S. Navy Hydrographic Office, **1953.** 10 p. 6 refs. ms. **DN-HO**—Report of a detailed study of the local and large scale synoptic patterns associated with the breaking wave and subsequent surge of March 18, 1952 at Southwest Pass, Louisiana and other points along the coast. Authors concluded that the oscillations observed on gages in the coastal embayments had periods of oscillation controlled primarily by shape and depth of the local basin. *Subject Headings:* **1. Storm surge synoptic conditions 2. Gulf of Mexico.**

6C–68 551.515:525.63

Deacon, G. E. R., *(Natl. Inst. of Oceanog., Dir.)*, **Destructive sea waves and surges.** *Discovery*, N. Y., 14(5):139–140, **1953.** ref. **DLC**—A brief, descriptive account of "seismic surges" (tsunamis) and "storm surges" with historical examples. Catastrophic storm surges result in cases when the forces of local winds, general circulation and tides reinforce one another. Difficulties of forecasting meteorological influences on tides stressed. *Subject Heading:* **1. Storm surges.**

6C–69 551.515:525.63

Dubach, H. W. and Maloney, W. E., **A discussion of the meteorological and oceanographical conditions resulting in the storm disaster in the Irish and North Seas on February 1, 1953.** Presented at American Geophysical Union Meeting, Wash., D. C., May 4, **1953.** 18 p. figs., eqs. ms. **DN-HO**—The chronological sequence of meteorological and oceanographical conditions culminating in the disastrous storm tides on Feb. 1, 1953, in the Irish and North Seas is reviewed. Each element taking part in the transfer of energy from the storm to the shore via the sea is discussed.

It is shown that the time of arrival, onshore, of the various energy carriers gives a clue to the reason for the extensive damage in certain areas. *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge synoptic conditions 3. Irish Sea 4. North Sea.**—*Authors' abstract.*

6C–70 551.515:525.6

Farquharson, William Ian, **Storm surges on the east coast of England.** In: Institution of Civil Engineers, London, North Sea Floods Conference, Dec. 1953, **Papers presented at the Morning Session, 16 December 1953,** p. 9–16. 7 tables. **DN-HO**—A historical tabulated summary of the greatest surges and highest levels, the absence of large surges at the highest spring tides and the increasing frequency of surges at Sheerness. High levels reached on other parts of the coast are compared with Sheerness data. Crest heights of the Feb. 1953 are compared to heights recorded in earlier floods. The widespread nature of the flooding in 1953 made that surge exceptional. *Subject Headings:* **1. Storm surge data 2. East coast, England.**

6C–71 551.515:525.63

†Guilcher, André (*Univ. de Nancy*), **Les inondations marines du 31 Janvier et du 1er Février 1953 sur les bords de la Mer du Nord.** [Marine inundations of Jan. 31 and Feb. 1, 1953 on the North Sea Coast.] *Revue pour l'Étude des Calamités,* Geneva, 13(30/31):1–19, Jan. 1952/Dec. 1953. 5 figs., bibliog. p. 18–19. **DWB**—Damages of storm surge summarized. Surge attributed to wind not pressure. Storm surge propagation discussed and illustrated with graph of 1949 North Sea surge (after Corkan), and the 1953 surge (after Rossiter). Evolution of the meteorological situation (Jan. 29–Feb. 1, 1953) charted. Area and extent of inundation described and plotted. *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge propagation 3. Netherlands 4. England.**

6C–72 551.556:551.481.1:532.594

Harris, D. Lee (*U. S. W. B., Wash., D. C.*), **Wind tide and seiches in the Great Lakes.** *Coastal Engineering Conference, 4th, Chicago, Oct.* **1953,** *Proceedings,* p. 25–51. 14 figs., refs., eqs. **DWB**—The theory of forced oscillations of a lake is developed and applied to actual data for the Great Lakes for 1950 and synoptic charts for the days with important disturbances analyzed. Both general and local disturbances are considered. *Subject Headings:* **1. Seiches 2. Lake level variations 3. Great Lakes.**—*M.R.*

6C–73 551.556(489)

Hellström, B., **Wind effect on Ringköbing Fjord.** *American Geophysical Union, Transactions* 34(2):194–198, April **1953.** 7 figs., table, 3 refs. **MH-BH**—Selected data on water level variations which were registered at six locations in Ringköbing Fjord, Denmark, are presented in conjunction with corresponding values of storm direction and velocity. The study is offered as a confirmation of the author's differential equation for the gradient of the water surface during storms, which had been substantiated earlier by data obtained on lakes in the U. S., Sweden and elsewhere. The formula accounts for depth of water, tangential wind stress on water surface, and volume weight of water. (*Same item as* 5.2–174, Feb. 1954, *MAB.*) *Subject Headings:* **1. Sea level variations 2. Storm surges 3. Ringköbing Fjord, Denmark.**—*G.T.*

6C–74 551.461.2:525.63

Jensen, H. A. P., **Tidal inundations past and present, Part I. Changing sea levels.** *Weather,* 8(3):85–89, March **1953. Pt. II. The extent of the inundation.** *Ibid.,* 8(4):108–113, April **1953.** figs., tables, refs., photos. **DWB**—In Pt. I changes of sea level in southern North Sea from Ice Age to present are summarized; main recent rises were before AD 0, AD 300–500, and 1000, but a slow rise still continues. Coast erosion is described in relation to tidal surges and meteorological conditions, and the surge of Jan. 31–Feb. 1, 1953, 8 ft above predicted level, traced. In Pt. II a map of the 1953 inundation is given and flooding described. At King's Lynn it exceeded next highest (March 11, 1883) by over a foot. Coastal erosion is briefly discussed and suggestions made. *Subject Headings:* **1. Storm surges 2. Netherlands 3. England.**—*C.E.P.B.*

6C–75 551.515:525.63(42,492):551.556

Kovacevic, M., **Katastrofalna poplava Severnot Mora u Engelskoj Holandiji, 1. februara 1953 godine.** [Disastrous storm surge on the English and Dutch coasts, Feb. 1, 1953.] *Yugoslavia, Hidrometeoroška Služba, Vesnik,* 2(2):45–52, April/June **1953.** 3 figs., refs. **DWB**—The mechanism of the storm surge of Feb. 1953 is explained as an effect of forces resulting from a) conjunction of sun, moon and earth; b) sudden atmospheric pressure drop and c) tangential wind stress on the water surface. The synoptic development leading to the disaster is discussed. Statistical figures on the extent of areas affected and damage caused are presented. (*Same item as* 6.1–221, Jan. 1955, *MAB.*) *Subject Headings:* **1. Storm surge dynamics 2. Storm surge synoptic conditions 3. North Sea storm (1953) 4. North Sea.**—*G.T.*

6C–76 551.515:525.63(68) 551.543:532.594

Wilson, Basil W. (*Texas A & M College*), **Generation of long-period seiches in Table Bay, Cape Town, by barometric oscillations.** *American Geophysical Union, Transactions*, 35(5):733–746, Oct. **1954.** 14 figs., table, 8 refs., eq. **MH-BH.** Also his: **Mechanism of seiches in Table Bay Harbor, Cape Town.** *Coastal Engineering Conference, 4th, Chicago, Oct. 1953, Proceedings*, p. 52–78. pub. **1954.** 11 figs., 5 tables, refs. **DWB.** See also: McNown, John S.; Wilson, B. W. and Carr, John H., **Discussion of long-period waves or surges in harbors.** *American Society of Civil Engineers, N. Y., Proceedings*, Vol. 79, Separate No. D-123, March **1953.** 13 p. figs., refs. Also: Carr, John H., **Long period waves or surges in harbors.** *A.S.C.E., Proceedings*, v. 78, Separate No. 123, April **1952.** **DWB**—Table Bay Harbor, Cape Town, South Africa, is shown to be subject to two wave phenomena resulting from seiches in Table Bay and from smaller oscillations peculiar to the harbor itself. The lower-frequency seiches occur within the harbor basins. These longer seiches are not of seismic origin, but a positive correlation is established between their occurrence at Table Bay and Port Elizabeth and simultaneous barometric oscillations in the air mass overlying both centers. There is dangerously powerful fluxing of water through the entrances to harbors from this cause; the frequency of these effects at Cape Town varies from one or two to about 15 occasions per year. Specific examples emphasize the importance of the directional approach of the barometric oscillations. Southeast winds from the land, although inducing barometric oscillations as a result of standing wave formation in the lee of Table Mountain, fail to generate seiches. The suggestion is advanced that the seiches derive from the aerial commotion arising out of the coalescence of frontal depressions near the extremities of such fronts. *Subject Headings:* **1. Seiches 2. Storm surges 3. Pressure oscillations 4. Table Bay Harbor, Union of South Africa.**—*Author's abstract.*

6C–77 551.515.11:551.579.4

§Müggе, Ratje, **Die meteorologischen Ursachen des Holland-Orkans.** [The meteorological origin of the Holland hurricane.] *Geographische Rundschau*, 5(11):420–424, Nov. **1953.** 4 figs. **DWB**—A description and synoptic analysis of the unusual pressure and cyclogenetic situation which resulted in the Great North Sea Flood on Jan. 31 and Feb. 1, 1953. The cyclone was not unusual, either as to depth or position, but the intense ridge of high pressure over the Iceland-Ireland-Bay of Biscay axis produced pressure gradients, advection of extremely cold air aloft and deepening over Holland which in turn yielded winds aloft of 300 km/hr (180 knots) or more. These combined with the highest tides of the year and the turbulence and squalliness resulting from the cold polar air moving over warm water to produce the high seas which overlapped and undermined the dikes. Surface, pressure change and dynamic charts for Jan. 31 and Feb. 1 illustrate the processes described. *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge synoptic conditions 3. Cyclogenesis 4. North Sea 5. Netherlands.**—*M.R.*

6C–78 551.465

Nieder, F., **Brandung an der Kanalinsel "Alderney."** [Surf on the Channel island of "Alderney."] *Der Seewart*, Hamburg, 14(2):21–23, April **1953.** fig., 3 photos. **DWB**—Author mentions waves that broke Dutch dikes Jan.–Feb. 1953 and recalls tremendous waves he witnessed on Alderney Island in spring of 1943. Photos show waves breaking to apparent heights of about 10 m. *Subject Headings:* **1. North Sea storm (1953) 2. Storm waves 3. Alderney Island 4. North Atlantic.**

6C–79 551.515:525.63

Peters, Sidney Percival, **Some meteorological aspects of North Sea Floods, with special reference to February 1953.** (In: Institution of Civil Engineers, London, North Sea Floods Conference. Dec. 1953, **Papers presented at the Morning Session, 16 December 1953,** p. 17–25. 8 figs.) **DN-HO**—A brief historical review of severe North Sea surges from 1086 A.D. is followed by a description of the meteorological situation of 30/31 Jan., 1953. The three synoptic situations responsible for the 37 floods in the River Thames between 1874 and 1928 are described and the Meteorological Office warning system of 1928–53 discussed. Effects of local winds and atmospheric pressure mentioned. A new flood warning service was initiated in Dunstable Sept. 15, 1953. *Subject Headings:* **1. Storm surge synoptic conditions 2. Storm surge warning services 3. England 4. North Sea storm (1953).**

6C–80 551.553.8:551.515:525.63

Poncelet, L., **A propos du "ras de marée" du février 1953.** [The "tidal wave" of Feb. 1, 1953.] *Ciel et Terre*, 69(3/4):93–96, March/April **1953.** refs. **MH-BH**—Although confusion of definitions exists, it would appear that tidal waves are of volcanic or seismic origin and should not be confused with storm waves or storm tides. The author examines the meteorological factors connected with the disaster of Feb. 1, 1953 and finds that it should be defined as a storm tide rather than a tidal wave. (*Same item as* 5.4–153, April 1953, *MAB.*) *Subject Headings:* **1. Storm surges 2. North Sea storm (1953) 3. Belgium.**—*G.T.*

6C–81 551.556:525.63

Hidaka, Koji, **Wind-driven sea level change of a shallow sea over a continental shelf.** Texas A. & M. College. Dept. of Oceanography, Contract N7 onr-48702, NE 120219-5, Project NR 083 036, Technical Report, No. 9, Oct. **1953.** 24 p. 6 figs., 6 tables, 42 eqs. **DWB**—A theory of wind-driven surface slope and level change in a shallow sea close to the coast is given taking into account the earth's rotation and both vertical and horizontal mixing. A wind zone of finite width extending from the coast is assumed and the surface slopes in a steady state are computed at several distances from the coast. If these are pieced together, we can give the surface water level change as a function of the distance from the coast. This research represents a portion of a voluminous work which the author is carrying out concerning the three-dimensional steady motion of water and the surface-contours as generated by a steady wind. *Subject Heading:* **1. Wind effects on water level.**—*Author's abstract.*

6C–82 551.515:525.63:551.465

†*Reid, Robert O. and Bretschneider, Charles L., **The design wave in deep or shallow water, storm tide, and forces on vertical piles and large submerged objects.** Texas A. & M. College, Dept. of Oceanography, Contract N7onr-48704, Contract DA-49-055-eng-18, Contract NOy-27474, Technical Report [unnumbered], Oct. **1953.** 36 p. 19+12 figs., eqs., 41 refs. **DWB**—Methods are presented which allow an estimate of the basic dimensions of design waves for offshore structures, the design still water depth, and the forces exerted by the design waves on pile structures and large submerged objects such as barges. A brief summary of deep water (and shallow water) hindcasting methods is given making use of meteorological data for the body of water concerned. Formulas for estimating storm tide rise on a continental shelf and a graph for evaluating the height of the wave crest above still water level are included as well as formulas and graphs for facilitating the estimation of the total wave force and position of action of the force on piles. *Subject Headings:* **1. Wave forecasting 2. Marine industry 3. Storm surge forecasting.**—*Authors' abstract.*

6C–83 551.515.1:525.63

Reynolds, G., **Storm-surge research.** *Weather*, 8(4):101–107, April **1953.** 4 figs., 4 refs., 2 eqs. **MH-BH**—Discussion of H. L. P. JOLLEY's formula for perturbations of sea level due to wind and pressure, and R. H. CORKAN's for North Sea surges, with application to that of Jan. 8, 1949. (*Same item as* 4.9–97, Sept. 1953, *MAB.*) *Subject Headings:* **1. Storm surges 2. Sea level variations 3. North Sea.**—*C.E.P.B.*

6C–84 551.553.8:551.515:525.63

Sneyers, R., **La tempête et le débordement de la mer du 1er février 1953.** [The storm surge of Feb. 1, 1953.] *Ciel et Terre*, 69(3/4):97–108, March/April **1953.** 6 figs., 2 tables, refs. Also issued as: *Belgium. Institut Royal Météorologique, Contributions*, No. 11, 1953. **MH-BH**—The synoptic situation connected with the storm tide of Feb. 1, 1953, characterized mainly by the eastward displacement of a depression over the North Sea, is described and illustrated with surface weather charts (Jan. 30, 31, Feb. 1), a chart showing positions of the depression center at 6-h intervals, and a chart of maximum wind velocities in Belgium. Wind directions and velocities are tabulated for six Belgian stations for Jan. 31 and Feb. 1. A statistical review of earlier storm tides is added. (*Same item as* 5.3–218, March 1954, *MAB.*) *Subject Headings:* **1. Storm surge data 2. Storm surge synoptic conditions 3. North Sea storm (1953) 4. Belgium.**—*G.T.*

6C–85 551.515(42):525.63

Steers, J. A., **The East coast floods. January 31–February 1, 1953.** *Geographical Journal* 119(3):280–298, Sept. **1953.** 7 figs., 10 photos. **DLC**—Detailed account given, with maps, of the genesis and propagation of the high water level from noon Jan. 29 to noon Feb. 1, including synoptic charts at 6 hour intervals of the intense North Sea depression which caused the surge. Predicted high tides, not especially high, were exceeded by 7–9 ft on east coast of England. Flood areas are mapped and damage described, including loss to industry and agriculture. Problems of preventing floods in future, on these coasts sinking by 1–2 mm a year, are discussed. (*Same item as* 5.6–122 June 1954, *MAB.*) *Subject Headings:* **1. Storm surge propagation 2. Storm surge synoptic conditions 3. North Sea storm (1953) 4. England.**—*C.E.P.B.*

6C–86 551.515(42, 493, 492):525.6

Szakács, Györgyné, **A januári és februári pusztító szélviharok és áradások.** [The disastrous storms and floods of January and February.] *Természet és Technika*, Budapest, 112(3):185, March **1953.** illus. **DLC**—Description of the cyclonic storms over England, the Netherlands and Belgium on Jan. 24 and 29, 1953, and of the storm surges connected with them. Three photographs of flooded areas presented and storm surge mechanism briefly explained. (*Same item as* 5.6–123 June 1954, *MAB.*) *Subject Headings:* **1. Storm surges 2. England 3. North Sea storm (1953) 4. Belgium 5. Netherlands.**—*G.T.*

6C–87 551.515:525.63

La tempête des 31 janvier et 1er février 1953 a Dieppe. [The storm of January 31 and February 1, 1953 at Dieppe.] *France. Comité d'Oceanographie et d'Études des Côtes, Bulletin d'Information,* 5(6):239–241, June **1953.** fig. **DN-HO**—A brief discussion of the storm of Feb. 1, 1953 with a graph showing water level at Dieppe. For a similar study of Le Havre see *Ibid.,* 5(7):291–292, July–Aug. **1953.** *Subject Headings:* **1. Storm surges 2. North Sea storm (1953) 3. Dieppe, France 4. Le Havre, France.**

6C–88 551.54:551.461.2

*Thiel, G., **Die Wirkungen des Luft- und Winddruckes auf den Wasserstand in der Ostsee.** [Influence of air and wind pressure on the water level of the Baltic Sea.] *Deutsche Hydrographische Zeitschrift,* Hamburg, 6(3):107–123, **1953.** 7 figs., 10 tables, 10 refs. German, English and French summaries p. 107. **DWB**—The relations between the weather situations over the North-Sea and the Baltic on the one hand and the sea level in the Baltic on the other hand are studied. Moreover, a method is developed allowing to ascertain the pressure distribution in any weather situation over the Baltic by way of mathematical calculation and to verify that the variations in sea level as compared to mean sea level in the Baltic depend on the respective air pressure distribution over the North-Sea and the Baltic. The variations in sea level in the Bay of Kiel as referred to mean sea level are represented as a function of the air-pressure distribution over the North-Sea and the Baltic. In conclusion, the application of the method to the great storm surge of November 13, 1872, in the Baltic and to the storm surge of September 23, 1924, in the Gulf of Finland clearly demonstrates its usefulness. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Baltic Sea 4. Finland.**—*Author's abstract.*

6C–89 551.556.2:551.461.2

Tomczak, Gerhard, **Die Einwirkung des Windes auf den mittleren Wasserstand der Deutschen Bucht vom 15. Februar bis 6. März 1951.** [The effects of the wind on the mean water level of the German bight from Feb. 15 to March 6, 1951.] *Deutsche Hydrographische Zeitschrift,* 6(1):1–17, **1953.** 8 figs., 4 plates, 3 tables, 18 refs. German, English and French summaries, p. 1. **DWB**—Curves of water level at 12 coast and floating stations between Wilhelmshaven and Husum were corrected for pure tidal effects, the wind disturbances plotted and isolines drawn twice daily. These are compared with synoptic charts. The results are discussed in detail including effects of onshore and offshore winds; disturbances of the order of 100 cm were found and their progress charted. Distant storm waves not thought important. A pure barometric effect on Feb. 27 -28 is examined. (*Same item as* 5.5–148, May 1954, *MAB.*) *Subject Headings:* **1. Wind effects on water level 2. North Sea 3. Germany.**—*C.E.P.B.*

6C–90 551.515.1(492):525.6

Ufford, H. A. Quarles v., **The disastrous storm surge of 1 February.** *Weather,* 8(4):116–120, April **1953.** fig., 2 photos, ref. **MH-BH**—An account with map of the flooding in Netherlands in 1953 due mostly to a sudden surge before high tide. Damage roughly estimate at £100 million. Quantitative forecasting system described and synoptic situation discussed. (*Same item as* 4.9–101, Sept. 1953, *MAB.*) *Subject Headings:* **1. Storm surges 2. North Sea storm (1953) 3. Netherlands.** —*C.E.P.B.*

6C–91 551.515:525.63

*§Ufford, H. A. Quarles v., **Die Ursachen der Sturmflut vom 1. Februar 1953 in Niederland.** [Causes of the Feb. 1, 1953 storm flood in the Netherlands.] *Die Erde,* Berlin, No. 3/4:195–207, **1953.** 5 charts, photos, table, refs. **DWB, DLC**—A translation by Ludwiga Jensch, from the Dutch, of an article dealing with the geographic and meteorological causes of the great storm flood of Feb. 1953 in the Netherlands. A series of 4 sea level synoptic charts shows the general features of the storm development from Jan. 30 to Feb. 1, 1953, and the path of the "hurricane" from near Iceland to the coast of Holland. The Dutch Storm Flood Warning Service and its warnings for this period are described, and comparison between this storm flood and previous floods (1894–1949) made. The storm in question was no more severe than 15 others which have occurred in the North Sea since 1900, but the combination of long duration (>12 hours), spring tides and great expanse of sea covered by the gales is considered to be the cause. *Subject Headings:* **1. Storm surge synoptic conditions 2. North Sea storm (1953) 3. Storm surge warning services 4. Netherlands. I. Jensch, Ludwig** (*trans.*).—*M.R.*

6C–92 551.515:525.63

Wemelsfelder, P. J., **The disaster in the Netherlands caused by the storm flood of Feb. 1, 1953.** *Conference on Coastal Engineering, Fourth, Chicago, Oct.* **1953,** *Proceedings.* p. 258–271. 18 figs., photos. **DWB**—Meteorologically the gale of 1953 was different from other heavy gales because of its long duration and its storm track down the length of the North Sea normal to the Dutch coast.

Effect of the gale on the water level at Rotterdam Hook as a function of time charted. Dikes collapsed on the landward sides. 1783 were drowned and 100,000 evacuated. *Subject Headings:* **1. North Sea storm (1953) 2. Storm surges 3. Netherlands.**

6C–93 551.515:525.63

Williams, W. W., **La tempête des 31 janvier et 1er février 1953.** [The storm of Jan. 31 and Feb. 1, 1953.] *France. Comité d'Océanographie et d'Études des Côtes, Bulletin d'Information,* 5(5):206–210, May **1953.** 2 figs. **DN-HO**—A general description of the synoptic conditions responsible for the surge is accompanied by a chart showing progressive water level crests southward down the east coast of Great Britain at Aberdeen, Tees, Immingham, Southend and Dover as the surge moved down the North Sea. *Subject Headings:* **1. Storm surge synoptic conditions 2. North Sea storm (1953).**

6C–94 551.556:525.63

Bowden, K. F., **Conference on the North Sea floods.** *Weather,* 9(2):57–58, Feb. **1954.** photo. **DWB**—Report of conference at Institution of Civil Engineers, Dec. 16–17, 1953, on damage to coastal defences and measures to restore them. Farquharson, W. I., **Storm surges on east coast of England;** Peters, S. P., **Some meteorological aspects of North Sea floods with special reference to that of Feb. 1953.** (*Same item as* 6.1–220, Jan. 1955, *MAB.*) *Subject Headings:* **1. North Sea storm (1953) 2. Storm surges.**—*C.E.P.B.*

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6C–95 551.515:525.63

Bowden, K. F., **The effect of flow through the Strait of Dover on storm surges in the North Sea.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints,* p. 75. **DN-HO**—Greatest elevation in North Sea surges seems to be in the south on a line between Harwich and Flushing, the surface then sloping down towards the Strait of Dover owing to the escapes of water into the English Channel. Observed rates of flow across a vertical section of the Strait have been related to the difference in sea level between the North Sea and the English Channel and to the local winds with the hope that results may have some application to the dynamical study of storm surges. *Subject Headings:* **1. Storm surge research 2. North Sea.**—*From author's abstract.*

6C–96 551.515:525.63

Carruthers, J. N. and Lawford, A. L. (*Brit. Natl. Inst. of Oceanography*), **The progress of the storm surge of January 31st/February 1st, 1953 as indicated by current meter observations in the southern North Sea.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints,* p. 74. **DN-HO**—Records from eight current meters in lightships in the southern North Sea indicates that for some days prior to the storm there was a piling up of waters in the middle of the sea. Jan. 31st the pent up water began to break out eastward. Wind shifts and resultant current shifts off East Anglia, in the Straits of Dover and between Spurn Point and Lowestoft discussed. *Subject Headings:* **1. Storm surges 2. North Sea storm (1953) 3. Ocean currents.**

6C–97 551.556:551.515:525.63

Charnock, H. (*British Natl. Inst. of Oceanog.*), **The drag of the wind on the sea.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints,* p. 73. **DN-HO**—An account is given of the results and methods of recent attempts to measure the drag of the wind on the sea. Evidence so far available is so conflicting that at no wind speed is the drag known within a factor of two. Variation of the drag with wind speed is a matter of argument, and variation with stability of the air and with state of sea or presence of currents is a matter of conjecture. *Subject Heading:* **1. Wind stress.**—*Author's abstract.*

6C–98 551.515:525.63

Doodson, A. T. (*Liverpool Obs. and Tidal Inst.*), **Storm surges.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints,* p. 59–61. **DN-HO**—"Surges" said to fall within that group of meteorological disturbances which occur within a period of one or two days. Storm surges are dynamical phenomena which cannot be explained or forecast by statistical correlations between pressure, wind and water level. *Subject Heading:* **1. Storm surge dynamics.**

6C–99 551.515:525.63

Egedal, J. (*Danish Met. Inst.*), **Some remarks on storm surges in Interior Danish waters.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.*

1954, *Reports and abstracts of communications, Preprints*, p. 76–77. **DN-HO**—Physical explanation of sea level rises which have been observed at the town of Randers on the eastern coast of Jutland and at the island of Funen near Jutland. Possibility that the phenomenon may be analogous to storm surges in the North Sea discussed. *Subject Headings:* **1. Storm surge dynamics 2. Randers, Jutland, Denmark 3. Funen Island, Denmark.**

6C–100 551.515:525.63

Farquharson, W. I. (*Hyd. Dept., Admiralty*), **Probabilities of very high levels at certain ports on the east coast of England.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints*, p. 78. **DN-HO**—Report of an investigation of the occurrence of very high levels in the Tees, at King's Lynn, Yarmouth and Sheerness during a 50 year period commencing in 1901. High levels reached about once a year at each port. 1953 surge outstanding in that it caused high levels at all points. *Subject Headings:* **1. Storm surges 2. England.**—*From author's abstract.*

6C–101 551.515:525.63

Freeman, John C., Jr. (*Texas A. & M.*), **Two-dimensional storm tides in shallow water.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints*, p. 82. **DN-HO**—The study of finite water level changes such as those usually called "storm tides" requires the solution of non-linear differential equations. Author presents the equation for a shallow sea of constant depth, tells how these equations are obtained by integrating the equations of motion and neglecting advection of water velocities, and suggests a method (suitable for hand computation and qualitative discussion) of solving the non-linear equations. The method is applied to the tides resulting from a circular storm moving toward a straight coast. *Subject Heading:* **1. Storm surge research.**

6C–102 551.515:525.63

Freeman, John C. and Bates, Charles C., **Present status of storm surge research in the United States of America.** U. S. Navy Hydrographic Office, Division of Oceanography, **1954.** 16 p. 11 figs., tables, bibliog. p. 13–15, eqs. Paper presented at the Symposium on Storm Surges of the International Union of Geodesy and Geophysics, Rome, Sept. 1954. **DN-HO**—An excellent review of storm surge research to date including 1) discussion of the definition of terms, 2) Lake Okeechobee and Fort Peck Reservoir projects of the Beach Erosion Board and Corps of Engineers, U. S. Army (Haurwitz, Keulegan, Saville), 3) Reid's, Freeman's and Harris's expansion of Haurwitz's research concerning the problems involved in dynamic wind set-up, 4) Burns', Bertholf's and Bates' research on the March 18, 1952 Gulf surge, 5) research at the California Institute of Technology and 6) research at Scripps Institution of Oceanography. *Subject Headings:* **1. Storm surge research 2. United States.**

6C–103 551.556:525.63

Goldsbrough, G. R. (*Durham Univ.*), **Wind-effects on the motion of the sea in an infinite channel and in a rectangular gulf.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints*, p. 72. **DN-HO**—Investigation aimed at examining analytically the effect of a steady wind in producing currents and surface displacements in (a) a rotating infinite channel, and (b) in a rotating gulf, both of uniform depth. *Subject Headings:* **1. Wind effects on water level 2. Storm surge dynamics.** —*From author's abstract.*

6C–104 551.515:525.63

Groen, P. (*K. Nederlands Meteorologisch Inst.*), **On the dynamics of wind surges in a bay or marginal sea.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints*, p. 62–64. **DN-HO**—A discussion of the groups of problems pertinent to the study of the dynamics of storm surges including: A) The dynamics of the purely stationary state and B) The effects of the nonstationarity of (a) the wind field and (b) the astronomical tide. *Subject Heading:* **1. Storm surge dynamics.**

6C–105 551.515:525.63

Hansen, Walter, **Dynamical investigations of storm surges.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* **1954,** *Reports and abstracts of communications, Preprints*, p. 71. **DN-HO**—Proceeding from the hydrodynamic differential equations, the wind's influence on horizontal and vertical movements (that is, drift and current and rise of sea level due to wind stress, respectively) in completely or partly enclosed ocean areas is discussed with due regard to the decisive factors. Quantitative relations between wind, drift, current, and the rise of sea level due to wind stress are deduced; they may be applied both to studies

in wind-produced oceanic circulation and considerations about the rise of sea level due to wind stress in adjacent seas. *Subject Headings:* **1. Storm surge dynamics 2. Wind effects on water level.**—*Author's abstract.*

6C–106 **551.556:551.465**

Hansen, Walter. **Über ein Verfahren zur Ermittlung der Gestalt der Meeresoberfläche bei zeitveränderlichem Windfeld.** [On a method of determining the configuration of the sea surface exposed to the action of a wind field changing with time.] *Deutsche Hydrographische Zeitschrift*, 7(1/2):15–22, 1954. 2 refs., 6 eqs. German, English and French summaries p. 15. **DWB**—The method of A. DEFANT for quantitative calculation of the hydrodynamic equations of any ocean area is extended to the determination of surges caused by wind variable in time, resulting from convergence in a channel. *Subject Headings:* **1. Wind-driven currents 2. Storm surges.**—*C.E.P.B.*

6C–107 **551.515:525.63**

Hellström, B. (*Royal Inst. of Techn., Stockholm*), **Certain recent investigations in connection with storm surges.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* 1954, *Reports and abstracts of communications, Preprints*, p. 69–70. **DN-HO**—Review of recent investigations of wind effects on shallow bodies of water (Lake Okeechobee), relationships between air velocities and stresses, water velocities and stresses, and wind set. *Subject Heading:* **1. Storm surge research.**

6C–108 **551.556:551.465(261.2)**

Lawford, A. L., **Currents in the North Sea during the 1953 gale.** *Weather*, 9(3):67–72, March 1954. fig., 2 tables, 4 refs. **MH-BH**—Daily air and water movements at 2 lightships in North Sea and Straits of Dover during gale of Jan. 30–Feb. 3, 1953 are tabulated. The discussion shows how the winds caused the great piling up of waters in the North Sea resulting in the flooding on the east coast of England. *Subject Headings:* **1. Wind driven currents 2. Storm surges 3. North Sea storm (1953).**—*C.E.P.B.*

6C–109 **551.515:525.63**

Liverpool Observatory and Tidal Institute, Birkenhead, England. **Research on North Sea storm surges.** *Dock and Harbour Authority*, 34(401):344–345, March 1954. 2 graphs. **DN-HO**—Brief discussion of early research (1919–), by PROUDMAN, DOODSON and CORKAN at the Liverpool Observatory and Tidal Institute and research by ROSSITER for the same Institute following the Feb. 1953 disaster. *Subject Headings:* **1. Storm surge research 2. North Sea.**

6C–110 **551.515:525.63**

Munk, Walter Heinrich, **Formation of oceanic surges.** *Original unchecked. Abstract in. American Meteorological Society, Bulletin*, 35(2):88, Feb. 1954. **DWB**—A discussion of offshore measurements of waves in the period range 1 to 30 minutes, describing results of observations which have been just recently analyzed. *Subject Heading:* **1. Storm surges.**

6C–111 **551.515:525.63**

Munk, Walter H. (*Scripps Inst. of Oceanog.*), **A numerical filter to reduce diurnal and semidiurnal tides.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* 1954, *Report and abstracts of communications, Preprints*, p. 79. **DN-HO**—Report of an investigation of non-astronomic (presumably meteorologic) variations in sea level with periods longer than one day. Numerical filter (used by GORDON GROVES, ref.) reduces by a factor of one thousand the rms amplitudes of the diurnal and semidiurnal tides. It is found that (non-astronomic) changes in sea level by a large fraction of a foot in a few days are not uncommon, and that such changes are coherent over several hundred miles. *Subject Heading:* **1. Storm surge research.**—*From author's abstract.*

6C–112 **551.515:525.36**

*Netherlands. Meteorologisch Instituut. **Stormvloed 1 Februari 1953.** [Storm flood of 1 February 1953.] Its *Meteorologisch Rapport*, No. 2, May 1954. 57 p. numerous figs., tables, eqs., refs. **DN-HO**—Report consists of four detailed and well illustrated papers in Dutch: GROEN, P., **Analysis of the variation of water level along the North Sea coast during the storm flood of 1953;** VAN DER HAM, C. J., **[Investigation of cyclone tracks associated with storm surges and the extreme probabilities of northwesterly storms];** PIJPKOORT, P. J., **[Statistical investigation of northwesterly storms at coastal stations];** and WEENINK, M. P. H., **[Contributions to the theory of oscillation in an enclosed bay with a non-homogenous wind field.]** *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge synoptic conditions 3. Wind effects on water level.**

6C–113 551.556:551.465:551.515

Proudman, J., **Note on the dynamics of storm-surges.** *Royal Astronomical Society, Monthly Notices, Geophysical Supplement,* 7(1):44–48, Oct. **1954.** refs., numerous eqs. **AGU.** Also his: **Note on the dynamical theory of storm surges.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* 7:344–351, 1954. **MH-BH**—A treatment is given of the fundamental differential equations relating to storm-surges, and then solutions of these equations are obtained for a channel of uniform width and depth in the absence of wind and variable atmospheric pressure. Friction and geostrophic effects are taken into account, but product-terms are neglected so that the equations are linear. The chief feature of the treatment is that approximate equations for the elevation of the sea-surface are obtained which depend on the depth-mean values of the current but not on the vertical distribution of the current. The solutions obtained represent damped Kelvin-waves and damped Poincaré-waves. (*See* 6.1–222, Jan. 1955, *MAB.*) *Subject Headings:* **1. Storm surge dynamics.**—*Author's abstract.*

6C–114 551.515:525.63

Reid, Robert O., **Formation of surges in an enclosed basin or practically enclosed basin by a moving atmospheric disturbance.** Original unchecked. Abstract in *American Meteorological Society, Bulletin,* 35(2):88, Feb. **1954. DWB**—Two problems of dynamic wind set-up are analyzed by the method of characteristics. The first is the one dimensional, time-dependent problem of water level anomaly developed in a narrow enclosed basin of constant depth due to a wind stress field moving down the axis of the basin. The second problem deals with the surges in a narrow bay of constant depth which opens into a deep sea, the wind field being considered as approaching from the sea. The example analyses are confined to the linear approximation (surges of small amplitude) in basins of constant depth. In this case the characteristics are straight lines on the x-t diagram and the problem of evaluating the water level anomalies is reduced to one of simple graphical addition of isolines. Extension of the method of characteristics to problems involving variable depth and large water level anomalies is possible. *Subject Headings:* **1. Wind stress 2. Storm surge dynamics 3. Storm surge propagation.**—*From author's abstract.*

6C–115 551.515:525.63

†Rodewald, Martin, **Der grosse Nordsee-Sturm von 31. Januar und 1. Februar 1953.** [The great North Sea storm of January 31 and February 1, 1953.] *Die Naturwissenschaften,* Berlin 41(1):1–10, **1954.** 19 figs., 28 refs. **DLC**—A good descriptive coverage of the 1953 North Sea storm illustrated with tidal curve charts, various surface and upper air pressure wind and temperature charts (Jan. 30–Feb. 1, 1953), cyclone track charts, barograms, diagrams of wind intensification and average pressure distribution of the cyclone and following anticyclone and a good list of references. *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge synoptic conditions.**

6C–116 551.46:551.556

Rodewald, Martin, **Die Wellenhöhen beim "Holland-Orkan."** [Wave heights in the Dutch hurricane.] *Wetterlotse,* No. 75:183–184, Sept. **1954. DWB**—Feb. 1, 1953 several examples quoted of wave heights up to 9 m. This was approached on several other occasions. *Subject Headings:* **1. Ocean wave heights 2. North Sea storm (1953).**—*C.E.P.B.*

6C–117 551.515.1:525.63

Rodewald, Martin, **Zur Entstehungsgeschichte des "Holland-Orkans."** [The history of the development of the "Dutch hurricane."] *Wetterlotse,* No. 72:113–129, June **1954.** 11 figs. **DWB**—The disastrous North Sea storm of Jan. 31–Feb. 1, 1953, is studied synoptically in great detail. Its growth from a warm front wave in the Atlantic on Jan. 29–30 is compared with model cyclone development (surface and upper air). The rapid deepening west of Scotland is attributed to the meeting of tongues of very cold Arctic air and very warm tropical air on Jan. 31. (*Same item as* 6.1–151, Jan. 1955, *MAB.*) *Subject Headings:* **1. Storm surge synoptic conditions 2. North Sea storm (1953).**—*C.E.P.B.*

6C–118 551.556:551.461.2

*Rossiter, J. R., **The North Sea storm surge of 31 January and 1 February 1953.** *Royal Society of London, Philosophical Transactions, Ser. A,* 246(915):371–400, Jan. 12, **1954.** 9 figs., 6 tables, refs. **DWB**—Corrected hourly data of sea level disturbance on both sides of North Sea, Jan. 28–Feb. 3, 1953, are tabulated, graphed and discussed. Pressure charts at 6 hr intervals and lines of equal disturbance at 3 hr intervals are drawn for Jan. 31–Feb. 2. Under the influence of northerly gales the level of the whole North Sea rose by an average of 2.2 ft. At 0 hr Feb. 1 the disturbance was nearly 8 ft in Thames and 9–10 ft in Scheldt; at 0600 anticlockwise rotation of disturbance lines brought a second peak of over 11 ft at Harlingen. The current through the Straits of Dover is analyzed and the prediction of surges at Southend discussed. (*Same item as* 6.1–223, Jan. 1955, *MAB.*) *Subject Headings:* **1. North Sea storm (1953) 2. Storm surge synoptic conditions 3. Storm surge forecasting 4. Storm surge data 5. North Sea.**—*C.E.P.B.*

6C–119 551.515:525.63

Rossiter, J. R. (*Liverpool Obs. and Tidal Inst.*), **The prediction of storm surges from meteorological forecasts.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* 1954, *Reports and abstracts of communications, Preprints*, p. 65–66. **DN-HO**—A discussion of the storm surge forecast method developed from research by PROUDMAN and DOODSON (6C–16) at the Liverpool Tidal Institute, its replacement with the modified method of CORKAN (6C–36 and 6C–37) and the need for further general investigations of storm surges with emphasis on predicting subsequent oscillations following the initial rise. *Subject Heading:* **1. Storm surge forecasting.**

6C–120 551.515:525.63

Schönfeld, J. C. (*Central Res. Div., Rijkswaterstaat, Netherlands*), **Combination effects of meteorological and astronomical tides.** *International Union of Geodesy and Geophysics, Association of Physical Oceanography, Rome, Sept.* 1954, *Reports and abstracts of communications, Preprints*, p. 86. **DN-HO**—Schematic solutions for the meteorological tide and for the astronomical tide are defined as a first approximation by neglecting the non-linear terms in the differential equations or approximating such terms by linear expressions. Then the combination effects are estimated by deducing a second approximation. Of each of the non-linear terms in the differential equations, the effect is considered separately. The estimations are applied to a schematic model of the southern funnel-shaped part of the North Sea. *Subject Headings:* **1. Storm surge research 2. North Sea.**

6C–121 551.515:525.63

Tomczak, Gerhard, **Der windstau- und sturmflutwarndienst für die deutsche Nordseeküste beim Deutschen Hydrographischen Institut.** [Wind set-up and storm surge warning service of the German Hydrographic Institute for the German North Sea coast.] *Deutsche Hydrographische Zeitschrift*, 7(1/2):35–41, 1954. 14 refs. **DLC**—An outline of the beginning, historical development, and the present organization of the service. Preparatory work providing the necessary basic data for the prediction of storm surges reaches as far back as to the late 19th century. During World War I, the first forecasts of wind effect were made for the internal use of the German Navy. Not until 1924 was a public service established at the Deutsche Seewarte, Hamburg. From 1937 to 1945 this service was performed by the Marineobservatorium at Wilhelmshaven and since 1945 by the German Hydrographic Institute, Hamburg. *Subject Headings:* **1. Storm surge warning services 2. Germany.**—*From author's abstract.*

SUPPLEMENTARY MATERIAL

6C–122 551.556:525.63

Doodson, A. T., **Meteorological perturbation of sea-level and tides.** *Royal Astronomical Society, Monthly Notices, Geophysical Supplement*, 1(4):124–147, 1924. 5 figs., 8 tables, 23 eqs. **DLC**—Perturbations of sea level are represented as a linear function of the atmospheric pressure and its gradients in two directions. Pressure gradients are used rather than wind. Relative effects of pressure systems over the Irish Sea and over its Atlantic approaches on elevation at Liverpool are analyzed as are the wind effects on sea level at Liverpool. *Subject Headings:* **1. Wind effects on water level 2. Pressure effects on water level 3. Storm surges 4. Liverpool, England 5. Newlyn England.**

6C–123 551.515:525.63

Prügel, H., **Die Sturmflutschaden an der Schleswig-Holsteinschen Westküste in ihrer meteorologischen und morphologischen Abhängigkeit.** [The meteorological and morphological aspects of the storm surge damage on the west coast of Schleswig Holstein.] *Kiel. Universität. Geographisches Institut, Schriften*, 11(3), 1942. Original unchecked. *Subject Headings:* **1. Storm surges 2. Schleswig Holstein, Germany.**

6C–124 551.515:525.63(08

Résumé du Symposium sur les Ondes de Tempête, tenu à la Xème Assemblée Générale de l'UGGI, Rome, Sept. 1954. [Résumé of the Symposium on Storm Waves, International Union of Geodesy and Geophysics, 10th General Assembly, Rome, Sept. 1954.] *France. Comité Central d'Océanographie et d'Études des Côtes, Bulletin d'Information*, 6(9):376–380, Nov. 1954. **DWB**—Papers by PROUDMAN, DOODSON, ROSSITER, CARRUTHERS, FARQUHARSON, BOWDEN, HACHEY MUNK, HELLSTROM, GROEN and FREEMAN are discussed and the discussions at the session on storm tides at the Rome Meeting summarized. Most of the papers were theoretical or based on Feb. 1953 disaster (storm floods) in North Sea. *Subject Headings:* **1. Storm surges 2. Wind wave analysis 3. I.U.G.G. Meeting, Rome, 1954 4. Symposia.**—*M.R.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

Akademiia Nauk SSSR, Izvestiia, Seriia Geofizicheskaia, Number 6, 1953.

Lipskaia, N. V.: **Anomal'noe pole lokal'noĭ neodnorodnosti s konechnym znacheniem elektroprovodnosti,** [Anomalous field of local heterogeneity with final value of electrical conductivity], p. 514–522.

Liubimova, E. A.: **Rol' temperaturoprovodnosti v teplovom rezhime zemli,** [Role of conductivity of temperature in the heat balance of the earth], p. 523–525.

Kitkin, P. A.: **O rel'efe svobodnoĭ poverkhnosti i poverkhnosteĭ razdela v more peremennoĭ plotnosti,** [Relief of a free surface and surfaces of discontinuity in a sea of variable density], p. 526–545.

Gavrilov, V. A.: **O nekotorykh aktual'nykh vorposakh ucheniia o vidimosti,** [Some actual problems in the study of visibility], p. 547–560.

Number 1, 1954.

Shuleĭkin, V. V.: **Razrushenie voln pod deĭstviem melkovod'ia,** [Destruction of waves by the action of shallow waters], p. 65–76.

Barteneva, O. D.: **Vidimost' ogneĭ v polevykh usloviiakh,** [Visibility of lights under field conditions], p. 77–82.

Sytinskaia, N. N.: **O nekotorykh parametrakh zritel'nykh funktsii,** [Some parameters of visual functions], p. 83–86.

Novye chleny Akademii Nauk SSSR, [New Members of the Academy of Sciences of the USSR], p. 87–96.

Number 2, 1954.

Timofeev, M. P.: **Ob izmenenii meteorologicheskogo rezhima pri oroshenii,** [Change in meteorological conditions by irrigation], p. 108–114.

Gutman, L. N.: **K voprosu o raschete temperatury pochvy,** [The problem of the calculation of soil temperature], p. 114–123.

Evseev, P. K.: **O prirode letnikh sukhoveev na iugo-vostoke Evropeĭskoĭ territorii SSSR,** [The nature of summer drought in the south-eastern part of the European USSR], p. 123–133.

Sretenskiĭ, L. N.: **Rasprostranenie zvuka v izotermicheskoĭ atmosphere,** [Sound propagation in an isothermal atmosphere], p. 134–142.

Kolesnikov, A. G.: **Vychislenie sutochnogo khoda temperatury moria po teplovomu balansu na ego poverkhnosti,** [Calculation of the diurnal course of sea temperature from the heat balance of the sea surface], p. 190–194.

Ukazatel' literatury po geofizike, vyshedsheĭ v sentiabre-dekabre 1953 g., [Index of literature on geophysics published during September–December 1953], p. 199–201.

Kandidatskie dissertatsii, zashchishchennye na zasedaniiakh Uchenogo Soveta Geofizicheskogo Instituta AN SSSR v 1953 g., [Dissertations defended at meetings of the scientific staff, the Geophysical Institute of the Academy of Sciences of the USSR], p. 205–208.

Number 3, 1954.

Sokolova, I. N. and Grigorash, Z. K.: **O vertikal'nykh kolebaniiakh tsentra tiazhesti korablia, dvizhushchegosia s postoiannoĭ skorost'iu na progressivnoĭ volne,** [Vertical oscillations of the center of a ship moving with constant speed on advancing waves], p. 280–287.

Pudovkina, I. B.: **Issledovaniia atmosfernogo elektrichestva na El'bruse,** [Investigations of atmospheric electricity on Elbrus Mountain], p. 288–292.

Smirnov, N. S.; Tantsova, N. N. and Shaposhnikova, I. I.: **K voprosu o proiskhozhdenii iader kondensatsii,** [The origin of condensation nuclei], p. 293–298.

Shuleĭkin, V. V.: **Morskoĭ atlas, t. II,** [Marine atlas, vol. 2], p. 299–300.

Number 4, 1954.

Velikanov, M. A.: **Obosnovanie gravitatsionnoĭ teorii dvizheniia nanosov,** [Basis of the gravitation theory of sediment motion], p. 349–359.

Dmitriev, A. A. and Bonchkovskaia, T. V.: **Vozdeĭstvie techenii na volnovye dvizheniia zhidkosti,** [Effect of currents on wave movements in a liquid], p. 360–374.

Shifrin, K. C.: **Amplitudy partsial'nykh voln pri rasseianii sveta oblachnoĭ kapleĭ,** [Amplitudes of partial waves during the scattering of light of cloud drops], p. 375–377.

Snezhinskiĭ, V. A. and Egorov, N. I.: **V. V. Shuleĭkin.—Fizika moria,** [Physics of the sea (Review)], p. 378–380.

Number 5, 1954.

Shuleĭkin, V. V.: **Dinamika vetrovykh voln i vetrovoĭ zybi,** [Dynamics of wind waves and ground swells], p. 451–480.

Ruzin, M. I.: **Nekotorye rezul'taty teoreticheskogo analiza chetyrekh sukhoveev,** [Results of a theoretical analysis of four dry winds], p. 481–493.

SHCHerban', M. I.: **Aktinometricheskiĭ spravochnik,** [Actinometric handbook,] p. 494.

Angewandte Meteorologie, Berlin, Volume 2, Number 3, November 1954.

Hesse, W.: **Ergebnisse von Pflanzentranspirationsmessungen mit Kleinlysimetern im Zusammenhang mit meteorologischen Einflüssen,** [Results of plant transpiration measurements with small lysimeters in relation to meteorological influences], p. 65–82.

Mrose, Helmut: **Bildung von Kondensationskernen im Sonnenlicht,** [Formation of condensation nuclei in sunlight], p. 82–86.

Fuss, F.: **Untersuchungen zur Frage des Windschutzes in gärtnerischen Kulturen,** [Investigations of wind-breaks in garden cultures], Pt. II, p. 86–95.

Annales d'Astrophysique, Paris, Volume 17, Number 5, 1954.

Laffineur, M., Mme; Michard, R. and others: **Observations optiques et radioélectriques de l'éclipse totale de soleil du 25 février 1952,** [Optical and radioelectrical observations of the total solar eclipse of February 25, 1952], p. 317–319.

Vigroux, Ernest: **Spectrophotométrie de l'éclipse de Lune du 29–30 janvier 1953,** [Spectrophotometry of lunar eclipse of January 29–30, 1953], p. 399–415.

St. Amand, Pierre and Pettit, Helen B.: **A comment on a four year study of the [OI] 5,577 in the night glow,** p. 427–428.

Great Britain. Meteorological Office, Geophysical Memoirs, Volume 11, Number 86, 1950.

Stagg, J. M.: **Solar radiation at Kew Observatory.**

Number 87, 1952.

Belasco, J. E.: **Characteristics of air masses over the British Isles.**

Number 88, 1952.

Bannon, J. K.; Frith, R. and Shellard, H. C.: **Humidity of the upper troposphere and lower stratosphere over Southern England.**

Number 89, 1952.

Best, A. C.; Knighting, E.; Pellow, R. H. and Stormonth, K.: **Temperature and humidity gradients in the first 100 m. over South-East England.**

Number 90, 1953.

Kirk, T. H.: **Seasonal change of surface temperature of the North Atlantic Ocean.**

Number 91, 1953.

Deacon, E. L.: **Vertical profiles of mean wind in the surface layers of the atmosphere.**

Number 92, 1954.

Sawyer, J. S.: **Day-to-day variations in the tropopause.**

Időjárás, Budapest, Volume 58, Number 4, July/August 1954.

Riesz, Ede; Pál, István and Konek, László: **Gyógyhely-klimatológiai vizsgálatok a Mátrában,** [Climatological investigation of health resorts in the Matra Mountains]. p. 197–205.

Kurelecz, Viktor: **Az időjárás hatása a legelőgyepekre,** [Effect of weather on pasture grass], p. 205–213.

Péczely, György: **A mediterrán klímajelleg ingadozásai Magyarországon,** [Fluctuations of Mediterranean factors in the climate of Hungary], p. 214–217.

Kéri, Menyhért and Szakács, Györgyné: **A felsikló és záporcsapadékok szétválasztása frontnaptár és öníró műszerek adatai nélkül,** [Separation of warm-front and shower precipitation without frontal calendar or data from recording instruments], p. 218–223.

Bodolai, István: **A Meteorológiai Világszervezetről,** [World Meteorological Organization], p. 224–227.

Bacsó, Nándor: **Az éghajlatkutatás módszertani kérdései,** [Methodological problems of climatology], p. 228–232.

Kallós, Imre: **A vízgazdálkodási vonatkozású állomások nyilvántartása,** [Listing of hydrological stations], p. 233–237.

A Meteorológiai Intézet Közleményei, [Communications from the Hungarian Meteorological Institute], p. 238–240.

A Meteorológiai Társaság Ügyei, [Transactions of the Hungarian Meteorological Society], p. 240.

Irodalom, [Reviews], p. 241–248.

Zách, Alfréd: **Az 1954 júliusi árvíz meteorológiája,** [Meteorological analysis of the floods of July 1954], p. 248–251.

Kakas, József: **Új mikroklima-kutatások a Bükkben,** [Microclimatic research in the Bükk Mountains], p. 251–252.

Hille, Alfréd: **A repülőgépek jegesedésének meteorológiai vonatkozásai,** [Meteorological aspect of the icing of aircraft], p. 252–254.

Ozorai, Zoltán: **Felhőszakadás a Mátrában,** [Cloudburst in the Matra Mountains], p. 254–255.

Kallós, Imréné: **Viztölcsér a Balaton felett,** [Water spout over Lake Balaton], p. 255–256.

Hille, Alfréd: **Munkaegyezmény a nemzetközi polgári repülésügyi szervezet és a meteorológiai világszervezet között,** [Working agreement between ICAO and WMO], p. 256–257.

Zerinváry, Szilárd: **A dinamikus meteorológiai kutatások új szinhelye: a Mars,** [Mars as a new field for research in dynamic meteorology], p. 257–259.

Szilágyi, Tibor: **Egyszerű eljárás a talaj nedvességtartalmának meghatározására,** [A simple method of determining soil moisture], p. 259.

Aujeszky, László: **"Párásság" helyett "pára"?,** ["Vapor" or "haze"?], p. 260.

Békéssy, Andrásné: **Rádióaktiv eső,** [Radioactive rain], p. 260.

Italy. Servizio Meteorologico dell'Aeronautica, Il Servizio Meteorologico dell'Aeronautica Italiana alla X Assamblea Generale U.G.G.I. pub. Rome, 1954.

Bilancini, Raoul: **Gli studi meteorologici in Italia nel triennio 1951–1953,** [Meteorological studies in Italy during 1951–1953], p. 27–36.

Fea, Giorgio: **La galleria aerodinamica e circolazione naturale dell' osservatorio de Monte Cimone,** [Free circulation wind tunnel of the Monte Cimone Observatory], p. 37–40.

Fedele, D. and Vittori Antisari, O.: **Sonda dinamica per la micura del campo elettrico terrestre,** [Dynamic sonde for the measurement of terrestrial electricity], p. 41–44.

Gazzola, Adriano: **La corrente a getto durante una situazione di blocco,** [The jet stream during a blocking situation], p. 45–52.

Rosini, Ezio: **Alcuni resultati dell'esame statistico delle osservazioni meteorologiche in Italia dal 1946–1953,** [Some results of statistical research in meteorological observations in Italy, 1946–1953], p. 53–63.

Rosini, Ezio: **Sulle tendenze barometriche in Italia,** [Barometric tendency in Italy], p. 65–70.

Santomauro, Luigi: **Un metodo sistematico d'impiego del nomogramma di Elsasser nella ricerca della variazione di flusso,** [Systematic method of utilizing the Elsasser nomogram in research on flow variation], p. 71–74.

Serra, Antonio: **Su una serie de osservazioni aerologiche dell'alta troposfera e bassa stratosfera interessanti ill Mediterraneo Occidentale,** [A series of aerological observations of the upper troposphere and lower stratosphere in the Western Mediterranean area], p. 75–78.

Vittori Antisar, Ottavio: **Sulla determinazione della distribuzione nell'atmosfera de nuclei di condensazione e di particelle ottenute per sublimazione,** [Determining the atmospheric distribution of condensation nuclei and of vapor sublimation particles], p. 79–84.

Journal of Atmospheric and Terrestrial Physics, London, Volume 6, Number 1, January 1955

Jones, Robert E.: **The development of an E-region model consistent with long wave phase path measurements,** p. 1–17.

Davies, Kenneth and Hagg, E. L.: **Ionospheric absorption measurements at Price Rupert** p. 18–32.

Scholte, J. G. and Veldkap, J.: **Geomagnetic and geoelectric variations,** p. 33–45.

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Ashburn, Edward V.: **The altitudes of the luminous layers in the Earth's atmosphere,** p. 67–68

Journal of Meteorological Research, Tokyo, Volume 5, Number 10/12, January 1954.

Daidoji, S.; Nakagawa, K. and Fukushima, T.: **Swells and microseisms observed at Hachij Island on the occasion of the typhoon "Agnes," on November 6, 1952,** p. 747–751.

Ogawara, M.; Yamazaki, H. and Tomatsu, K.: **On the reading errors by intuitive interpolation** p. 752–763.

Ito, N.; Okawa, T. and Kobayashi, T.: **On the turbulence and the thermal equilibrium in th atmosphere near the ground surface,** p. 764–773.

Kimura, K.; Fujita, T. and Iwato, Z.: **On the trajectory around a model cyclone,** p. 774–777

Ishii, Y. and Takeishi, Y.: **On the local coastal cyclone and local cold air mass,** p. 782–785.

Shimoda, S. and Fujiwara, S.: **A note on the wet bulb scale reading,** p. 786–789.

Iwata, I.: **Application of upper air temperature to weather forecasting,** p. 790–793.

Yamamoto, S.: **On the rainfall amount and water level in the upper region of the river "Ishi kari,"** p. 794–800.

Volume 6, Number 1/3, March 1954.

Sugimoto, Y.: **On the eye of typhoon "Nina" 1953,** p. 1–7.

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Nakahara, H.: **On the fog at Aikawa** (1), p. 60–64.

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Regional forecasting on cool summer damage and drought: Introduction, p. 71–72.

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Chap. 2. On the cool summer damage (2)—Hokkaido, p. 82–86.

Chap. 3. On the cool summer damage (3)—Iwate Prefecture, p. 87–100.

Chap. 4. On the drought—Hiroshima Prefecture, p. 101–121.

Volume 6, Number 5, May 1954.

Arakawa, H.: **Fujiwhara on five centuries of freezing dates of Lake Suwa (36°N, 138°E) in th Central Japan,** p. 138–146.

Volume 6, Number 6, July 1954.

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Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. and **Ser. Geofiz.,** [Moscow].
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★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
★**Australian Meteorological Journal,** [Melbourne].
Ciel et Terre, Société Belge d'Astronomie, Météorologie et Physique du Globe, [Brussels].
★**Geofisica e Meteorologia,** Società Italiana di Geofisica, [Genoa].
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Geophysical Magazine, [Central Meteorological Observatory, Tokyo].
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★**Időjárás,** Magyar Meteorólogiai Társaság and Országos Meteorológiai Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
★**Journal of Atmospheric and Terrestrial Physics,** [London].
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★**Journal of Meteorological Research,** [Tokyo].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
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Nature, [London].
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Revista de Geofísica, Instituto Nacional de Geofísica, [Madrid].
★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**South Africa. Weather Bureau, Notos,** [Pretoria].
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Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** American Meteorological Society, [Boston].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**WMO Bulletin,** World Meteorological Organization, [Geneva].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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